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Binder 079, Gogorderidae B-G [Trematoda Taxon Notebooks]

Harold W. Manter Laboratory of Parasitology

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Bicornuata Pearse, 1949

Generic diagnosis. — Gorgoderidae, Plesiochorinae: Body stout; posterior end truncate, with two finger-like lateral papillae. Oral sucker large, pharynx less than one third as wide. Ceca extending almost to posterior extremity. Acetabulum very large, pre-equatorial, with two blunt marginal papillae laterally. Testes branched, symmetrical, overlapping ceca near middle of hindbody. Genital pore immediately anterior to acetabulum, median. Ovary somewhat lobate, situated immediately behind acetabulum, on the left. Vitellaria lobate, situated symmetrically just posterior to acetabulum. Uterus intercecal, partly extracecal, reaching as far back as cecal ends; eggs small. Excretory vesicle? Parasitic in gall bladder of turtles.

Genotype: *B. caretta* Pearse, 1949 (Pl. 57, Fig. 69⁷), in gall bladder of *Caretta caretta*; Beaufort, N. C.

Family GORGODERIDAE: Subfamily ANAPORRHUTINAE

BICORNUATA, new genus *Pearse, 1949*

Body stout; posterior end truncate, with two fingerlike lateral papillae; also two blunt lateral papillae on the inside of the acetabulum. Suckers large, the acetabulum more than a third wider than the oral sucker; pharynx less than a third as wide as the oral sucker. Enteric rami extend almost to posterior end; genital pore median and anterior to acetabulum; ovary immediately posterior to acetabulum; vitellaria lateral to it and branched; testes lateral, branched, between vitellaria and posterior end; uterus extends near posterior end. The genus is named for the two papillae at the posterior end and for the two lateral papillae in the acetabulum.

Type.—*Bicornuata caretta*, new species, from *Caretta caretta* (Linnaeus).

BICORNUATA CARETTA, new species *Pearse, 1949*

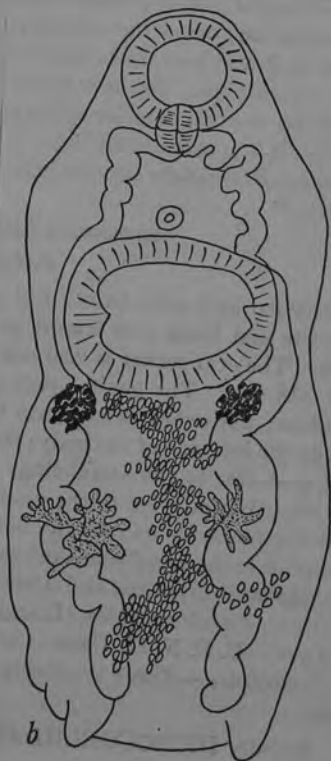
FIGURE 9, b

Body flat and wide, length 1.61 mm., width 0.88 mm., posterior end truncate and bears two lateral papillae 0.12 mm. long and 0.1 mm. wide. The oral sucker is 0.38 mm. wide, acetabulum 0.61 mm., pharynx 0.13 mm. The genital pore is immediately anterior to the acetabulum; the ovary is elongate transversely, somewhat lobate, and lies on the left side of the body; the vitellaria lie on the intestinal rami just posterior to the acetabulum and are lobate; the branched testes are directly posterior to the vitellaria almost halfway between them and the posterior end of the body; the uterus is coiled irregularly posterior to the acetabulum and extends as far back as the enteric rami; the eggs are ellipsoidal and 0.036 mm. long.

Host.—*Caretta caretta* (Linnaeus).

Type.—U. S. N. M. Helm. Coll. No. 36966.

Occurrence.—Three specimens came from the gall bladder of the host.



BICORNUTA

CETIOTREMA Manter, 1970

Generic Diagnosis of Cetiotrema: Gorgoderidae. Gorgoderinae. Body large, with almost parallel sides and rounded ends; sides of body thin but rest of body may be highly muscular. Minute papillae on ventral surface. Suckers equal or subequal in size. Testes ovoid, diagonal, intercaecal; cirrus and cirrus sac lacking; seminal vesicle at least partly anterior to genital pore. Ovary pretesticular, to right of midline; seminal receptacle lacking. Vitellaria of three claviform lobes on each side, sometimes branching at ends; preovarian. Uterus of narrow coils, mostly or entirely intercaecal. Eggs non-operculate; embryos partly developed. Excretory pore dorsal, well anterior to posterior end of body. Parasitic in the urinary bladder or ureters of pelagic marine fishes. Type species: *Cetiotrema crassum*. Other species: *Cetiotrema carangis* (Manter, 1947) n. comb.

The name *Cetiotrema* is from *cetio* = monstrous or large; and *trema*, for trematode. The name *crassum* is from *crassus* = thick, referring to the thick, muscular body of that species.

Discussion: Distinctive characters of *Cetiotrema* are large body size; broadly rounded ends; thick body but with thin sides; caeca distant from sides of body which are largely unoccupied by organs; chiefly intercaecal uterus; vitellaria consisting of claviform lobes arising as three on each side; and seminal vesicle at least partly anterior to genital pore. Other Gorgoderinae are generally much smaller.

The genus *Phyllodistomum* Braun, 1899 contains many species occurring in the urinary bladder of both marine and freshwater fishes. These species are thin-bodied and usually have a length of one to a few millimeters. It is, however, the nearest related genus to *Cetiotrema*, and one species, *P. carangis* Manter, 1947 (Fig. 4), 8 mm in length, from *Caranx ruber* (Bloch) in the Gulf of Mexico, can be considered a second species of *Cetiotrema*. It differs from *C. crassum* in smaller size and other characters but agrees in broadly rounded ends; caeca distant from sides of body; vitellaria consisting of three elongate lobes; papillae on the ventral surface; narrow, intercaecal uterine coils, and seminal vesicle anterior to the genital pore. It is from a pelagic fish. Although found in the body cavity, it probably was from the urinary bladder. *Phyllodistomum carangis* was compared with *P. acceptum* Looss, 1901, from the urinary bladder of *Crenilabrus* spp. in the Mediterranean. *Phyllodistomum acceptum* does seem to have somewhat similar vitellaria but the body is more tapered, the caeca nearer the sides of the body, the seminal vesicle posterior to the genital pore, and the uterine coils extend nearly to the sides of the body. Considering these characters together with the host, *P. acceptum* seems to be closely related to *P. (Vitekkaninus) crenilabri* Dolgikh & Naidjenova, 1968 from the Black Sea.

Mamaev (1968) has described a species, *Phyllodistomum lancea*, from the kidney of *Euthynnus affinis* and *Auxis thazard* in the South China Sea. It is related to *C. crassum* and perhaps should be considered a third species of *Cetiotrema*. It does not appear to have a wide body with rounded ends but its figure shows longitudinal lines suggesting that the sides of the body may be folded inward ventrally. Its seminal vesicle is entirely anterior to the genital pore. However, the vitellaria are rather compact, lobed, grape-like masses rather than elongate tubes, and chiefly on that basis the species is retained for the present in the genus *Phyllodistomum*. It is about the same size as *C. carangis*.

Known life cycles of Gorgoderidae are as yet limited to freshwater species, but those of marine species are probably similar. The molluscan host is a bivalve mollusc; cystocercous cercariae develop in daughter sporocysts, emerge, and are ingested by a second intermediate host which, in different species, may be a variety of animals: insect larvae, crustaceans, snails, or tadpoles. In one species, *Phyllodistomum simile* Nybelin, 1926, precocious metacercariae in sporocysts are infective to the final host. Life cycles of marine species probably involve bivalve molluscs and Crustacea.

Cetiotrema crassum gen. nov., sp. nov. MANTER, 1970

(Figures 1-3)

Host: *Thunnus thynnus maccoyii* (Castelnau); Thunnidae; southern bluefin tuna.**Localities:** East Bass Strait and Kangaroo Island, South Australia.**Collected by:** C.S.I.R.O.; 1939.**Number:** 4 (one incomplete); 2 from 1 host in each locality.**Holotype:** South Australian Museum, No. E863.**Paratype:** U.S. National Museum, Helminth. Coll. No. 71424.

Description (Measurements on 3 specimens, all somewhat contracted and compressed after preservation. Measurements are in mm unless otherwise indicated): Body very large, thick, muscular, with almost parallel sides, broadly rounded at each end. Length 20.0 to 25.5; width 7.5 to 8.5. Sides of body thin and slightly thrown into short folds. Dorsal surface smooth; ventral surface, where not eroded, covered with minute papillae. Strong longitudinal muscles in parenchyma except near sides of body.

Oral sucker ventral, subterminal, circular, 1.2 to 1.5 wide. Forebody 2.755 to 3.8 long. Acetabulum circular, with circular aperture and longitudinal cavity; 1.235 to 1.615 wide. Sucker ratio 1:1.

Pharynx lacking, but anterior portion of oesophagus thick-walled. Oesophagus (contracted) about 0.348 to 0.536 long; bifurcation slightly nearer oral sucker than to acetabulum. Caeca extending to within 2.185 to 2.7 of posterior end of body; not far apart; dividing body width into approximate thirds.

Genital pore median, about midway between acetabulum and bifurcation of oesophagus. Testes a little anterior to midbody, ovoid, smooth or slightly crenulated, diagonal, intercaecal, separated by short space; 1.52 to 2.28 long by 1.14 to 2.09 wide. Seminal vesicle a rounded to elongate sac, inconspicuous, between acetabulum and bifurcation of oesophagus, partly anterior to genital pore; cirrus sac and cirrus absent; prostatic duct short, surrounded by small, radially arranged prostatic cells, antero-dorsal to genital pore.

Ovary ovoid, smooth, to right of midline, pretesticular, separated from anterior testis by uterine coils. Vitellaria immediately anterior and to left of ovary; intercaecal; consisting of claviform lobes, three on each side, sometimes branching. Seminal receptacle lacking. Uterine coils narrow, extending to ends of caeca or slightly beyond; mostly intercaecal but frequently slightly lateral to caeca ventrally; extending between testes, between anterior testis and ovary, and lateral to acetabulum on both sides. Metraterm glandular or at least lined with cells, longitudinal, between genital pore and acetabulum. Eggs 38 to 45 by 20 to 29 microns; operculum apparently lacking; embryo only partially developed.

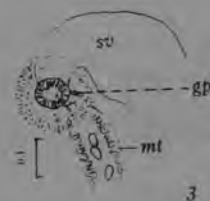
Excretory pore conspicuous, dorsal, glandular, 1.140 to 1.158 anterior to posterior end of body. Excretory vesicle not seen.

The trematodes described below were sent to me by L. Madeline Angel, of the University of Adelaide, South Australia. They were collected by the Commonwealth Scientific & Industrial Research Organization (C.S.I.R.O.) from East Bass Strait and Kangaroo Island in 1939. Two specimens were collected from each of two tuna fish. The three complete and one incomplete specimens are remarkable for their large size. To the naked eye they suggested in size and shape such trematodes as *Fasciolopsis buski* but were even more muscular.

Each specimen was sharply bent ventrally near midbody and evidently strongly contracted. It was necessary to unfold (or cut) and then compress the specimens before they could be mounted on a slide and studied. After staining in Delafield's haematoxylin, each specimen was clamped between two slides, using brass clamps with screws to compress the slides tightly together, then passed through the alcohols to 100% before releasing. Compression of living specimens at the time of killing is preferred handling, but no important distortion seems to result from considerable mechanical pressure after preservation. However, only limited flattening can be achieved in this way.

The large size of these worms indicates they must bend or curl within the ureter of their host and their mass is such that some injury to the tuna must result. No information on incidence or intensity of infection is available.

Most parasites of such large size, especially when infecting a host of economic importance, are described in early literature. The location in the ureter, an organ often not examined for parasites, may explain why this genus seems to be undescribed.



Marine ✓

Cetiotrema carangis (Manter, 1947) Manter, 1970
CONSIDERED LOOSS, 1901

syn: 129. *Phyllodistomum carangis* n. sp. Manter, 1947

Fig. 94

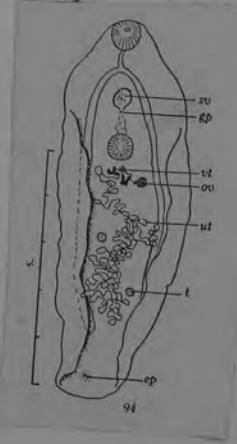
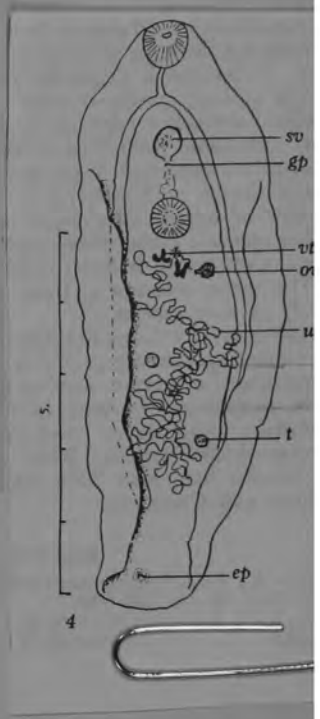
HOST: *Caranx ruber* (Bloch), runner, or jack; in 1 of 6 hosts examined; 1 specimen.
LOCATION: Recovered from washing of body cavity; original location probably the urinary bladder.

Description: Length 8.061 mm; width at level of genital pore 2.639 mm; the sides of posterior portion of the body folded over dorsally during killing; the body normally widens at about acetabular level. Body very thin, delicate and leaf-like; ventral surface covered throughout with small papillae, dorsal surface smooth. Oral sucker 0.686 mm in diameter; acetabulum 0.537 mm in diameter; sucker ratio about 1:0.8. Forebody 2.529 mm. Pharynx lacking; esophagus 0.474 mm long; intestinal ceca inconspicuous extending to about 1.9 mm. from posterior end of body. Genital pore median, midway between acetabulum and intestinal bifurcation. Testes very small, round, with no sign of lobing, diagonal, far apart, separated by uterus, 0.255 mm in diameter; posterior testis 2.09 mm from posterior end of body and 0.728 mm posterior to anterior testis. Seminal vesicle globular, 0.438 mm in transverse diameter, anterior to genital pore. Ovary 0.401 mm posterior to acetabulum, ovoid

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and slightly irregular in shape, to right of median line, directly to the right of the right vitelline gland. Vitelline glands a short distance posterior to acetabulum, close together, each deeply lobed to give a tripartite, anchor-like appearance. Mehlis' gland immediately anterior to vitellaria. Uterus in slender coils, almost wholly intercecal, extending posteriorly to a point 1.456 mm from posterior end. Eggs 32 to 36 by 19 to 22 μ . Excretory pore dorsal, 0.416 mm from posterior end of body. No posterior notch of the body.

Comparisons: The genus *Phyllodistomum* is a very large one. Most species are from Amphibia or fresh-water fishes. Lewis (1935) clarified much of the developing confusion regarding the genus. *P. carangis* seems to be most similar to *P. acceptus* Looss, 1901 from *Crenilabrus* (= *Bodianus*) from Egypt. It differs in more posterior genital pore, more anterior excretory pore, shorter esophagus, more rounded testes, more anterior acetabulum and slightly smaller eggs. It differs from *P. americanum* in being much larger, in its very much smaller and more elongate eggs, in unlobed testes, and other characters.



CETIOTREMA

Cylindrorchis, gen. nov. Southwell, 1913

Body cylindrical. Oral and ventral suckers present, the latter being situated near the anterior extremity. Genital pore minute and situated immediately posterior to oral sucker. Intestinal rami in form of a continuous letter S and extending to the posterior end. Testes in front of germarium. The former are paired, cylindrical, thick, conspicuous, bent in the form of the letter S. They extend, one on each side, from the anterior margin of the ventral sucker to a point one-third the length of the worm from the posterior end. Germarium and shell gland single, median, and situated immediately behind posterior limit of testes. Uterus coiled and lying for the most part behind the germarium. Vitelline glands aggregated into two main masses, lateral to the germarium, and situated on the loop of the intestine, one mass on each side. Excretory pore median, terminal, posterior.

The character of the testes indicates that this genus has no close relationship with any other known genera.

Parasitic in fishes.

Cylindrorchis tenuicutis, sp. nov. Southwell, 1913

(Pl. x, figs. 17-18.)

During the examination of a number of specimens of *Tetrodon stellatus*, caught on the Ceylon Pearl Banks in 1911, a few Trematodes were found in the air-bladder. In every case where these Trematodes were obtained, the air-bladder was found to be full of a

black shiny substance having the consistency of wet clay. It is possible that this substance represents decomposed blood, the exudation of blood into the air-bladder being caused by the sucking action of the parasite. Unfortunately a sample was not kept for examination. The parasites lay embedded in this mass and measured 16 mm. long and 5.5 mm. broad. In shape they were cylindrical. The oral sucker is terminal and subventral. The ventral sucker is situated 3.5 mm. from the anterior extremity. Both suckers have a diameter of .8 mm., and are but feebly developed. The most remarkable feature of this parasite is the almost entire absence of muscles from the body-wall, the various organs being encased in an exceedingly thin diaphanous transparent cuticle. This circumstance is to be correlated with the habits of the parasite, living as it does in a medium where movement is well nigh impossible. The mouth is situated at the base of the oral sucker. This leads directly into a muscular pharynx. The oesophagus is very short. The two rami of the intestine are large sinuous tubes having a diameter of 1.1 mm. and being usually filled with a dark brown material apparently derived from the medium in which they live. Both rami of the intestine run to the extreme posterior end, where they terminate blindly.

As only a very few specimens of the parasite were obtained, it was found impossible to satisfactorily make out, with certainty, the precise details of the reproductive system. I am therefore not certain that the following description is absolutely correct in every detail.

The genital pore is minute and is situated ventrally, immediately posterior to the oral sucker.

The testes are a pair of very large, sinuous, cylindrical bodies situated one on each side, and extending to a point about 6 mm. from the posterior extremity. Anteriorly, each gives off a vas deferens, and these unite in the middle line. The cirrus is bent upon itself. The main mass of the vitelline glands is aggregated over a loop of the intestine, one mass on each side, immediately behind the termination of the testes. The main ducts run transversely, towards the median line, and open at the junction of the ovary and shell gland. These latter organs are situated close together, in the middle line, about 5 mm. from the posterior extremity, the shell gland being posterior to the ovary. The uterus is a coiled tube. For the first part of its length it lies posterior to the ovary, and then runs forward, sinuously, in the middle line (anterior to the ovary) to the genital pore.

The excretory pore is terminal, but no details of this system could be made out.



18.

The habitat, the thin cuticula, the lack of a
cirrus sac, the posterior extent of the uterus,
the limited extent of the vitellaria, all suggest
the Gorgoderidae subfamily Anaporrhaginae.
The subfamily Cyliandrochinae Yamaguti, 1958
is probably justified but not his classification
in the Callodistomatidae.

MANTER, 1962

CYLINDROTRICHIS

Degeneria gen. n.
Campbell, 1944

Generic diagnosis: Gorgoderidae. Body flat, divided into broadly tapered forebody and foliate hindbody. Oral sucker large, ventroterminal, with funnel-shaped cavity. Preoral papilla present. Acetabulum large, equatorial. Pharynx well developed; esophagus short; ceca simple, terminating near posterior extremity. Testes in midregion of hindbody, overlapping ceca ventrally. Cirrus pouch containing bipartite seminal vesicle, prostatic cells, and short ejaculatory duct. Genital pore preacetabular. Ovary submedian, pretesticular. Seminal receptacle large, intertesticular. Laurer's canal absent. Vitellaria lobed, immediately postacetabular, intercecal. Uterus occupying all of hindbody and extending laterally to various levels in forebody. Eggs large, embryonated. Excretory vesicle bifurcating between testes, arms short. Parasitic in urinary system of marine teleosts.

The name *Degeneria* is derived from *degener* (= departing from its kind) and refers to the unusual characteristics of this gorgoderid. Type and only species: *Degeneria halosauri* (Bell 1887) comb. n.

DISCUSSION

Degeneria seems to be most closely related to the Anaporrhutinae Looss 1901 and Probolitrematinae Yamaguti 1958 on the basis of possession of a pharynx, separate ceca, two-part body, and location of testes. Except for the differences in distribution of the uterus and habitat of these subfamilies (coelomic cavities of elasmobranchs), *Degeneria* seems to be more closely related to the Anaporrhutinae because of the large, lobed, cecal testes and large seminal receptacle. Ignoring the presence of a pharynx, the combined characteristics of *Degeneria* are closest to those of *Dendrorchis* Travassos 1926 which has been placed in the subfamily Phyllostominae (Nybelin 1926) Yamaguti 1958. Although *Dendrorchis* lacks a pharynx, it is the only example of a gorgoderid sharing the characteristics of the uterus extending into the forebody and a cirrus pouch. Further similarities include the tapering forebody, diagonal and strongly branched testes, internal seminal vesicle, pretesticular and intercecal ovary and vitellaria, large seminal receptacle, configuration of the ceca, position of the genital pore, and being parasitic in teleosts. Except for the I-shaped excretory vesicle and absence of a pharynx, *Dendrorchis* is more closely related to *Degeneria* than to other members of Phyllostominae.

Unfortunately, few life histories are known among gorgoderid subfamilies and the affinities of *Degeneria* to the Phyllostominae (*Dendrorchis*) and Anaporrhutinae lead to speculation that the largely crustacean diet (Haedrich, pers. comm.) of *Halosauropsis macrochir* indicates a life history pattern similar to that shown for species involving precocious development of metacercariae within sporocysts or involving crustacean hosts. The morphological affinities of *Degeneria* to other gorgoderids would seem to provide evidence of divergent evolution and in a sense might be construed to show alliance of gorgoderids to the Allocreadiidae (Looss 1902) Stossich 1903 because of its pharynx and large eggs, as did Coil's (1960) discovery of a gorgoderid cercaria that is not cystocercous but resembles an allocreadiid cercaria without eyespots.

Campbell, 1944

Degeneria halosauri (Bell 1887) ~~comb. n.~~
 Syn. *Distomum halosauri* Bell 1887
 (Figs. 1-4)

Description (142 specimens; 32 measured and 3 sectioned); Gorgoderidae, *Degeneria*. Body length 3.4 to 7 mm (4.8 mm); forebody broadly tapered into foliate hindbody, junction somewhat indistinct or more pronounced upon slight constriction of hindbody; resembling *Phyllodistomum*. Hindbody broadly oval, 1.6 to 4.5 (2.9 mm) wide. Oral sucker ventroterminal, conical, diameter 500 to 1.24 mm (777); cavity 640 to 1.2 mm (1.02 mm) deep. Preoral papilla 115 to 161 long; possesses large pore, above dorsal margin of oral sucker. Acetabulum equatorial, sessile, with shallow lumen and narrow rim; 550 to 1.4 mm (1.02 mm). Sucker width ratio 1:1.1 to 1.6 (1:1.2). Pharynx 200 to 310 (253) by 160 to 253 (207); esophagus 210 to 506 (345) long. Cecal bifurcation preacetabular; ceca curving toward midline in hindbody and ending near posterior end of body. Cirrus pouch dorsoventral near anterior edge of acetabulum, about 448 by 266 (measured from sections), containing bipartite seminal vesicle, prostatic cells, and short ejaculatory duct. Genital pore median, immediately preacetabular. Testes slightly oblique, ventral to ceca in widest part of hindbody, with 7 to 12 large, irregular lobes; 300 to 1.28 mm (757) by 450 to 950 (719). Ovary 180 to 560 (424) by 210 to 550 (364), lobed, submedian, dextral, at level of anterior testis. Mehlis' gland and vitelline reservoir medial to ovary. (Seminal receptacle elongate, 450 to 1.7 mm by 200 to 690, lobed, intertesticular. Vitelline glands paired, lobed, intercecal, overlapping posterior margin of acetabulum or close to it, 240 to 713 by 100 to 322. Uterus extensive, descending in midline from ootype, coils filling hindbody and ascending laterally to anterior margin of acetabulum or occasionally to level of pharynx; muscular uterine bulb pyriform, glandular, posteroventral to cirrus pouch, connecting with genital pore by short, glandular duct. Eggs variable, increasing with body size, 82 to 110 (93) by 50 to 77 (58), embryos released upon dehiscence. Excretory vesicle Y-shaped, arms terminating at level of testes, pore terminal.

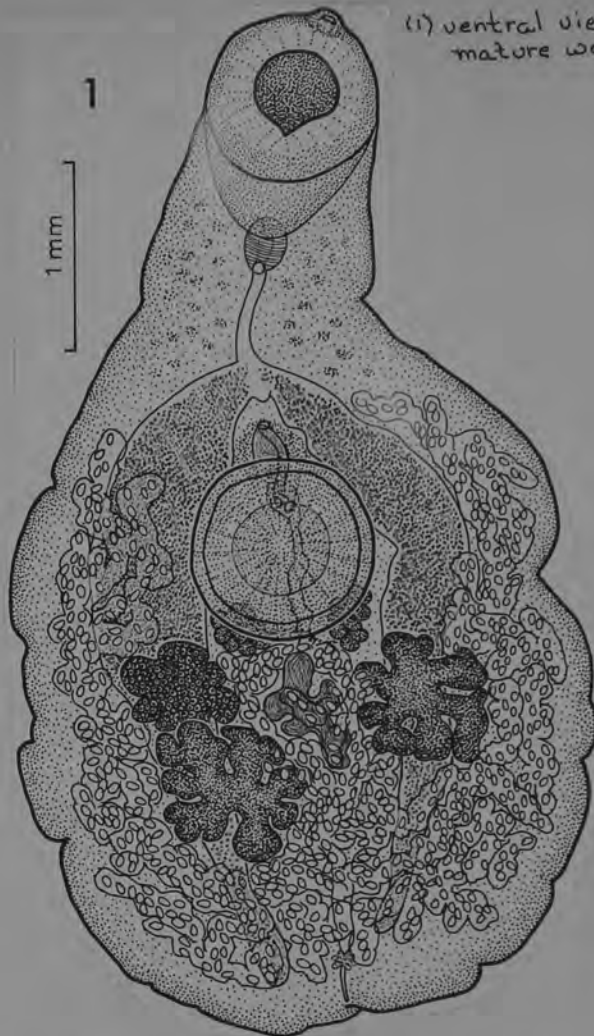
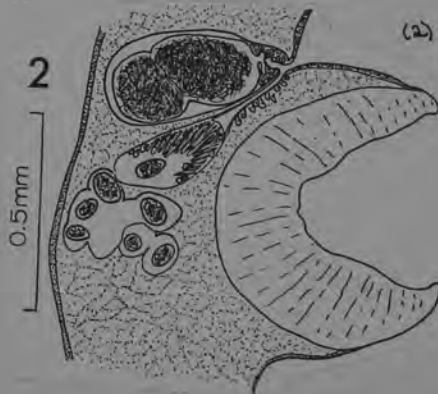
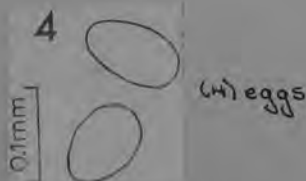
Host: *Halosaurus macrochir* (Günther 1878); Halosauridae.

Habitat: Ureter.

Locality: Hudson Canyon, western North Atlantic, and adjacent continental slope at depths of 1,691 to 2,654 m.

Incidence: Thirty-two of 46 fish infected; intensity 1 to 14 (4.5) per host.

Museum specimens: USNM Helm. Coll. No. 73548; additional specimens and sections in Manton Laboratory, Division of Parasitology, University of Nebraska State Museum, No. 20242; and the British Museum (Natural History).

(1) ventral view
mature worm(2) reproductive
terminalia
(reconstructed
from sections)(3) sagittal section
through
acetabulum

(4) eggs

Distomum halosauri Bell 1887, from the ureters of *Halosaurus macrochir* (Günther 1868), is fully described and reclassified from fresh material taken from the type host during studies of deep-sea benthic communities in the Hudson Canyon area. The species is a gorgoderid closely resembling *Dendrorchis* Travassos 1929, but several unusual features require that it be placed in a new genus. Bell (1887) originally described this species as *Distomum halosauri* from three specimens removed from the ureters of *H. macrochir* taken at a depth of 1,090 fathoms off Cape St. Vincent during the H.M.S. *Challenger* expedition. Until relatively recently this was the greatest depth from which an adult digenetic trematode was known. Although Bell did not figure his specimens it has long been recognized that the species was similar to *Phyllodistomum* (see Manter, 1934) but his description was insufficient to place it in a known genus. From his brief description of body dimensions (5.5 mm by 3 mm) and egg size (106 by 70) and distribution it can be seen that my specimens agree with Bell's except for his statement that the acetabulum is twice the diameter of the oral sucker. The sucker ratios of the three type specimens in the British Museum (Natural History) have been retaken in a communication from S. Prudhoe and R. Bray. The sucker ratio of the mounted specimen is 1:0.94 and 1:1.7 for each of the two unmounted specimens. They also note that egg size and shape is variable (96 to 120 by 42 to 88 μm). The morphology of the acetabulum is best observed in unmounted specimens as shallow and saucerlike and its lumen is twice that of the oral sucker.

Specimens were obtained from fish taken in semiballoon, shrimp, or beam trawls. Living worms were studied and then fixed in AFA at room temperature without pressure. Additional specimens were obtained from fish preserved in 10% neutral buffered formalin. Whole mounts were stained with Mayer's paracarmine and some counterstained with fast green to provide contrast to surface structures. Serial sections, cut at 8 to 10 μm in sagittal and frontal views were stained with Harris' hematoxylin and counterstained with eosin. Descriptive measurements include the range followed by the mean in parentheses. All measurements are in micrometers unless otherwise indicated and are expressed as length by width. Figures were drawn with the aid of a drawing tube or microprojector.

DEGENERIA

Gorgoderina Looss, 1902

Generic diagnosis. — Gorgoderidae, Gorgoderinae: Body elongate. Oral sucker subterminal. No pharynx. Esophagus short, ceca simple, terminating at posterior extremity. Acetabulum prominent, in anterior third of body. Testes two, tandem, somewhat diagonal, intercecal, post-ovarian. Vesicula seminalis pre-acetabular. Genital pore median or submedian, immediately postbifurcal. Ovary submedian, in middle third of body. Vitellaria compact or lobed, paired in front of ovary. Uterine

coils occupying most of hindbody. Eggs embryonated. Excretory vesicle tubular, bifurcate anteriorly. Parasitic in urinary bladder of amphibians. *Gorgoderina* is split by Pereira and Cuocola (1940) into two subgenera, *Gorgoderina* and *Neogorgoderina*, with *G. (G.) vitelliloba* (Olsson) and *G. (N.) simplex* (Looss) as type species respectively, but the latter species being the type of the genus, *Neogorgoderina* should be suppressed. *Gorgorimna* Pigulevsky, 1952, is included in *Gorgoderina*.

Genotype: *G. simplex* (Looss, 1899) Looss, 1902 (*Distoma cygnoides* var. B of Bensley, renamed) in *Rana catesbiana*, *R. clamitans*, *R. pipiens*, *Bufo americanus*; North America.

Key to species — Puslevsky in Skrjabin (1953).

Other species:

- G. attenuata* (Stafford, 1902) Stafford, 1905 (Pl. 41, Fig. 509), in *Rana catesbiana*, *R. virescens*; Canada. Also in *Rana* and *Bufo* spp., *Triturus viridescens*, U.S.A.; *R. sp.*, Guatemala.
- Sporocyst and cysticercous cercaria develop in *Sphaerium occidentale*, cercaria encysts in body cavity, particularly around heart and liver, of tadpoles. Metacercariae have 9 testes, which are fused to 2 in immature individuals. Definitive development in bladder of *Rana* and *Triturus* after migrating from intestine via kidney and ureter—Rankin (1939, 45). Encapsulated in kidney of *Rana catesbiana* — Goodchild (1950).
- G. aurora* (Ingles, 1936) in *Rana aurora*; N. America.
- G. bilobata* Rankin, 1937, in *Amblystoma opacum*, *Desmognathus fusca*, *Pseudotriton montanus* and *P. ruber ruber*; N. Carolina. Also in *Bufo fowleri*, *Rana catesbiana*, *R. pipiens*; Georgia.
- G. capensis* Joyeux et Baer, 1934, in *Rana esculenta* var. *ridibunda*; Tunis.
- G. carli* Baer, 1930, in *Uraeotyphlus oxyurus*; S. India.
- G. cedroi* Travassos, 1924, in *Elosia nasus*; Brazil.
- G. chilensis* Dioni, 1947, in *Rhinoderma darwini*; Montevideo.
- G. cryptorchis* Travassos, 1924, in *Bufo crucifer* and *Leptodactylus ocellatus*; Brazil. Also in *Bufo d'orbignyi*; Paraguay.
- G. diaster* (Lutz, 1926) in *Hyla* spp.; S. America.
- G. intermedia* Holl, 1928, in *Triturus viridescens*; N. America.
- G. megalorchis* Bravo, 1948, in *Bufo marinus*; Mexico.
- G. multilobata* Ingles et Langston, 1933, in *Rana boylei*, *R. pretiosa*, *R. aurora*; California.
- G. opaca* (Stafford, 1902) Stafford, 1905, in American toads and frogs.
- G. orientalis* Shtrom, 1940, in *Rana esculenta ridibunda*; Kirghisia.
- G. parvicara* Travassos, 1922, in *Leptodactylus ocellatus*, *Rana*, *Bufo*, *Pseudis*; S. America.
- G. permagna* Lutz, 1926, in *Leptodactylus pentadactylus*; S. America.
- G. rochalimai* Pereira et Cuocolo, 1940, in *Bufo paracnemis*; Paraiba, Brazil.
- G. schistorchis* Steelman, 1938, in *Necturus maculosus*; Oklahoma. "Should be included in *Phyllodistomum*" — Goodchild (1943).
- G. skarbilovitschi* Pigulevsky, 1953, syn. *G. attenuata* of Sokoloff and Caballero, 1933, in *Rana montezumae*; Mexico.
- G. skrjabini* Pigulevsky, 1953, in *Rana temporaria*; Russia.
- G. tanneri* Olsen, 1937, in *Rana pretiosa*; N. America. Flame cell formula: $2[(4+4+4+4)+(4+4+4+4)]$ — Byrd et al. (1940).
- G. tenuis* Rankin, 1937, in *Eurycea guttolineata*; N. Carolina.
- G. translucida* (Stafford, 1902) Stafford, 1905, in American toads, frogs, and *Triturus americanus*; Canada, Maine.

G. vitelliloba (Olsson, 1876) Looss, 1902, in *Rana temporaria*, *R. ridibunda*, *R. arvalis*, *Bufo vulgaris*, *Bombinator igneus*; Europe, Asia minor. *Cercaria macrocerca* Fil. in *Sphaerium cornicum* — Ruszkowski (1926); Miracidia entered *Sphaerium* sp. and *Pisidium* sp. Cercariae when fed to tadpoles became metacercariae. Metacercarial cysts were found in tadpoles of English *Rana temporaria* and these gave rise to adults when fed to frogs and toads known to be free from infection — Lees (1953).

4 3. CLAVE PARA LA DETERMINACIÓN DE LAS ESPECIES DEL GÉNERO *Gorgoderina*

- 1 (10) Vitelógenos con acinos perfectamente diferenciados y libres
sub-gen. *Gorgoderina*
- 2 (3) Cuerpo con la región posterior ancha, plana y transparente; ancho
alrededor de un tercio de la longitud; vitelógenos con dos o
tres acinos *G. translucida*
- 3 (2) Cuerpo subcilíndrico en toda su extensión; región posterior opaca
- 4 (5) Con espinas en las ventosas, vitelógenos formados por siete a nueve
folículos *G. multilobata*
- 5 (4) Sin espinas en las ventosas
- 6 (7) Tres acinos bien diferenciados en los vitelógenos *G. vitelliloba*
- 7 (6) Más de tres acinos en los vitelógenos
- 8 (9) Cuatro a seis acinos en los vitelógenos *G. tanneri*
- 9 (8) Siete a doce acinos en los vitelógenos *G. rochalimae*
- 10 (1) Vitelógenos sin acinos bien diferenciados, aunque pueden tener sur-
cos más o menos profundos sub-gen. *Neogorgoderina*
- 11 (20) Vitelógenos lisos, compactos y sin cisuras
- 12 (13) Acetábulo menor que la ventosa oral *G. parvicava*
- 13 (12) Acetábulo mayor que la ventosa oral
- 14 (15) Ovario mayor que cada uno de los testículos *G. cryptorchis*
- 15 (14) Ovario menor que cada uno de los testículos
- 16 (17) Vitelógenos de forma irregular, muy separados del acetábulo
G. intermedia
- 17 (16) Vitelógenos de forma regular, situados cerca del acetábulo
- 18 (19) Testículo anterior a nivel del ovario *G. carli*
- 19 (18) Testículo anterior separado y posterior al ovario *G. cedrori*
- 20 (11) Vitelógenos con cisuras
- 21 (22) Poro genital izquierdo *G. capensis*
- 22 (21) Poro genital mediano
- 23 (26) Testículos lobulados
- 24 (25) Testículos superficialmente lobulados, formando masas regulares
G. attenuata
- 25 (24) Testículos profunda e irregularmente lobulados, el anterior menor
G. schistorchis
- 26 (23) Testículos no lobulados
- 27 (28) Ovario en forma de riñón *G. aurora*
- 28 (27) Ovario oblongo
- 29 (30) Testículo anterior alejado del ovario *G. simplex*
- 30 (29) Testículo anterior cercano del ovario
- 31 (32) Tres o cuatro bucles uterinos espesos anteriores a los vitelógenos
G. bilobata
- 32 (31) El útero no forma bucles espesos delante de los vitelógenos
- 33 (34) Testículo posterior mayor que el ovario; relación entre el ancho y
el largo 1:3,8; relación cotilo acetabular 1:1,3 *G. tenua*
- 34 (33) Testículo posterior menor que el ovario; relación ancho: largo
1:7,4; relación cotilo acetabular 1:2,1 *G. chilensis*

from Dioni, 1947

SPECIES	Length in mms.	Width in mms.	Diameter of the oral sucker	Diameter of the ventral sucker	Dimensions of the eggs in μ	Hosts	Distribution
<u>Gorgoderina</u> <u>attenuatus</u> (Stafford, 1902)	4.5 - 8.	0.55	0.28	0.67	51 x 36	<u>Rana catesbiana</u> Shaw <u>R. virescens</u>	North America
<u>G. carli</u> Baer, 1930	3.	0.56	0.38	0.63	27 x 19	<u>Uraeotyphlus oxyurus</u> (Gray)	India (meridional)
<u>G. cedroi</u> Travassos, 1924	4.3 - 6.	1.	0.45	0.75	35-40 x 21	<u>Elosia nasus</u> (Licht.)	South America
<u>G. cryptorchis</u> Travassos, 1924	4. - 4.7	1.	0.5	0.62	35-40 x 21	<u>Bufo crucifer</u> Weid <u>Leptodactylus ocellatus</u> (L.)	South America
<u>G. intermedius</u> Holl, 1928	1.4 - 2.8	0.43	0.24	0.39	?	<u>Triturus virescens</u> Rafin.	North America
<u>G. parvicara</u> Travassos, 1919	6. - 11.	1.5	0.56	0.44	39-42 x 28	<u>Bufo crucifer</u> Weid <u>B. marinus</u> (L.) <u>Cystignathus ocellatus</u> (L.) <u>Leptodactylus ocellatus</u> (L.) <u>L. pentadactylus</u> (Laur.)	South America
<u>G. simplex</u> Wooss, 1899	7. - 12.	0.7	0.47	0.62	37 x 25	<u>Rana catesbiana</u> Shaw	North America
<u>G. translucida</u> (Stafford, 1902)	9.45	1.2	0.45	0.73	40 x 28	<u>Bufo lentiginosus</u> Shaw <u>Rana virescens</u>	North America

Table from Baer, 1930.

Gorgoderina (*G.*) *africana* n. sp. MESKAL, 1970
(Text fig. 17)

Host: *Rana angolensis* (BOGAGE, 1866)
Habitat: Urinary bladder
Locality: R. Tafo
Number inspected: 9
Number infected: 2
Number of worms recovered: 8
Date of collection: 22.11.68.

Description

General Morphology: The description is based on four whole mount and one sectioned specimen. The elongate body has a lanceolate outline with narrow pre-acetabular body which is more or less of uniform width and a post-acetabular region which is relatively wide gradually tapering post-testicularly. The non spinous integument is smooth and delicate. Body length 4020–5850 (4740), maximum width lies in the ovo-testicular region and measures 480–660 (570). The small well developed oral sucker is situated subterminal ventral measuring 270–390 (310) by 210–300 (245). Acetabulum is much larger than the anterior sucker, situated in the anterior quarter of body length, 300–540 (450) behind the oral sucker, it measures 540–600 (570) in diameter, about 1.54 to 2 times the anterior sucker.

Digestive System: There is no pharynx, the buccal cavity thus opens directly into a relatively long esophagus 185–259 (222) by 52. Intestinal bifurcation lies about half way between oral sucker and acetabulum. The simple slender and long ceca extend dorso-posteriorly on either side of the acetabulum up to almost the posterior extremity of body.

Reproductive System: The male organs consist of rather large ovoid smooth surfaced testes situated at tandem in the middle third of the body. Post-testicular space varies from 1200 to 1590. Anterior testis is situated very close to the ovary, sometimes directly bordering the latter. It measures 300–480 (410) by 240–330 (290). Posterior testis is 480–600 (530) long, and 210–330 (280) wide. Inter-testicular space varies from 150 to 450. The seminal vesicle is large and globular (up to 510 in diameter) almost filling the pre-acetabular intercecal space ventrally.

A short muscular ejaculatory duct surrounded by glandular cells leads to the common genital atrium situated at the level of the intestinal bifurcation.

In the female system the ovary lies in the median line at the anterior half of body length, 450–540 (467) behind the acetabulum. It is almost globular to slightly elongate measuring 180–420 (300) in diameter. Vitelline gland is made up of two large ovoid to slightly elongate smooth surfaced and entire follicles. They are usually situated one on either side of the median line just in front of the ovary. Uterus is long consisting of both descending and ascending limbs that make several dorso-ventral and transverse loops filling the post-vitelline intercecal space.

They extend laterally up to but not exceeding the outer margins of the ceca. Anterior to the vitellaria the uterus takes a more or less straight course past the acetabulum dorsally to just behind the intestinal bifurcation where it joins a muscular metraterm. The latter is surrounded by secretory cells in the anterior half of its length.

Discussion

Only three species of *Gorgoderina* have been reported from Africa, namely *G. capensis* JOYEUX and BAER, 1934 from *Rana esculenta* var. *ridibunda* in Tunisia; *G. vitelliloba* from *Rana ridibunda* in Morocco, and *G. insularis* RICHARD, CHAUBAD and BRYGOO, 1968 from *Ptychadena mascareniensis* in Malagasy. Unlike

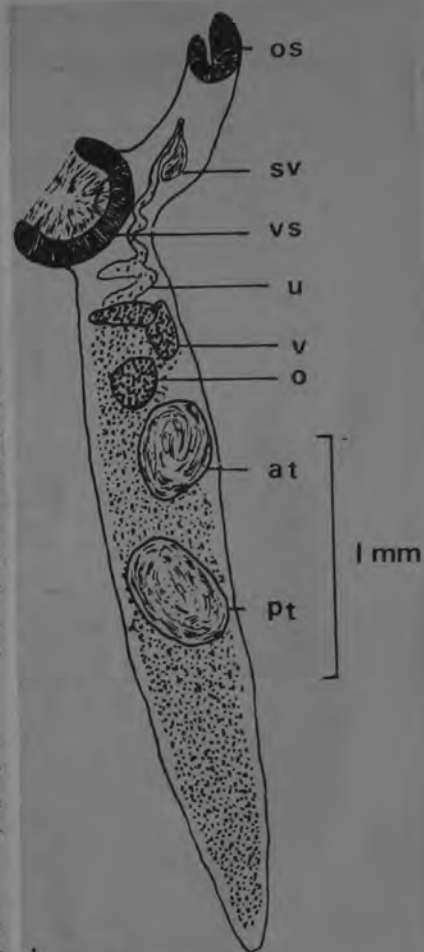


Fig. 17. Ventral view of *Gorgoderina africana* n. sp.

the present specimens, the ventral sucker in *G. capensis* does not protrude beyond the surface of the body. *G. insularis* differs from the present species in (a) the ratio between oral and ventral suckers, (b) the disposition of the vitellaria in relation to the acetabulum and in (c) egg size.

The present species comes very close to *G. vitelliloba* as described by DOLLFUS (1958) from *Rana ridibunda*. DOLLFUS argues that PIGULEVSKY's criteria based on variations in the location of the gonads in relation to the vitellaria cannot be reliable, as this is an intra-specific variation rather than inter-specific. Unfortunately DOLLFUS does not compare his African specimens with the original descriptions of *G. vitelliloba*. It is true the descriptions of this species by OLSSON (1876) and SINITSYN (1905) are inadequate. But such detailed anatomical accounts of the species as that given by WALKER (1937) cannot be ignored. According to the latter author the vitellarium of *G. vitelliloba* consists of two parts, each compact, trilobed and situated in either side of the body. His illustrations show the vitelline glands to be much longer than wide. On the other hand, vitellaria in DOLLFUS' African specimens are not trilobed, although a slight indentation in one of them is evident. Their shape is also more or less globular rather than elongate. Moreover the African specimens have acetabula almost twice the size of the oral sucker, while the ratio between the two suckers according to WALKER is 1:1.24. Accordingly DOLLFUS' *G. vitelliloba* from Morocco rather appears to me as a new species of *Gorgoderina*, and is not identical with *G. vitelliloba*. The Ethiopian species has a lot in common with DOLLFUS' Moroccan worm: shape and size of vitellaria, size of eggs (there must, presumably, be a typographical error in DOLLFUS' work regarding the size of one of the eggs given as 32.9 by 31), size of body, relative disposition of gonads and vitellaria. The two differ only in the ratio of the suckers. The Ethiopian specimens definitely represent a new species here described as *Gorgoderina (G.) africana*. The Moroccan specimens have more affinity to this species rather than to *G. vitelliloba*.

Specific Diagnosis: With the concept of the subgenus *Gorgoderina*, ratio of anterior to ventral sucker 1:1.54–2; gonads entire, oval to elongate; vitelline follicles not lobed; eggs about 29.6 by 22.2.

Gorgoderina alobata Lees and Mitchell, 1966

Dimensions, except where otherwise stated, are taken from whole mounts of specimens flattened by gentle coverslip pressure, and are given in millimetres.

DIAGNOSIS. Body elongate, oval, blunt anteriorly, tapering slightly posteriorly, widest at ventral sucker; not markedly attenuated. Length 2.24-3.20; width 0.64-0.95. Oral sucker subterminal, almost spherical, 0.38-0.50 x 0.40-0.51. Ventral sucker large, spherical, extending to lateral margins of body and into posterior half of body 0.52-0.71 x 0.52-0.69. Oral sucker/ventral sucker ratio, 1.00-1.37 approx. Oesophagus length 0.22-0.42 (average 0.30). Intestinal bifurcation nearer ventral sucker than oral sucker, situated 0.12-0.25 (mean 0.19) in front of ventral sucker. Intestinal caeca do not reach posterior extremity of body, but usually attain posterior end of posterior testis. Testes close together, lying somewhat obliquely to each other, behind ovary and between intestinal caeca, in posterior third of body; not lobed, not greatly elongated. Anterior testis 0.17 x 0.27 x 0.12-0.33. Posterior testis 0.16-0.35 x 0.12-0.26. Vas deferens formed from union of vasa efferentia about one-fifth of way from anterior edge of ventral sucker. Seminal vesicle transverse or obliquely transverse, just above anterior margin of ventral sucker. Genital pore ventral, just behind intestinal bifurcation. Ovary oval, immediately behind vitellaria, situated obliquely in front of anterior testis 0.21-0.30 x 0.20-0.24. Laurer's canal often readily discernible in whole mounts, 0.13 long. Vitellaria compact, unlobed, usually close together, medial, immediately behind ventral sucker. Mehlis's gland readily discernible, between or just in front of vitellaria. Diameter (from sections) 0.08. Uterus forms loose coils in post-acetabular part of body; it does not widen as it approaches genital pore. Eggs oval, spaced in single file except in old specimens, 0.0304 x 0.0214.

HOST. *Bombina variegata*.

LOCATION. Urinary bladder.

LOCALITY. Austria.

TYPE SPECIMENS. Deposited in British Museum (Natural History), London. Specimen nos. 1965.6.25.1-2.

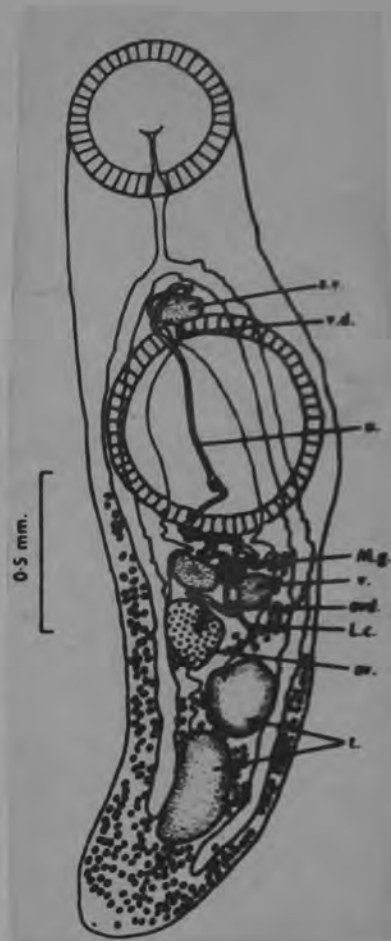
The parasite described above is unlike any previously described member of the genus *Gorgoderina*. It is therefore considered to be a new species, for which the name *G. alobata* is proposed.

COMPARISON WITH EXISTING SPECIES

The species which most closely resembles *G. alobata* is *G. carli* Baer, 1930, from the Indian coccidian, *Urascotyphlus oxyurus* (Gray). The two species are alike in that they are of a similar size and have relatively large suckers. They both possess unlobed vitellaria, ovary and testes, and have relatively short intestinal caeca. However, in *G. alobata* the ventral sucker is situated relatively much farther back along the body and the vitellaria, ovary and testes occupy a large proportion of the post-acetabular region; in *G. carli* the ventral sucker is well forward and the vitellaria, ovary and testes are grouped close together near the middle of the body.

G. vitelliloba (Olsson, 1876) from *Rana temporaria*, *R. ridibunda* and *Bufo bufo*, and *G. skrjabini* Pigulevsky, 1953, from *R. ridibunda*, are the only two species of the genus previously described from Europe.

G. alobata is much shorter than *G. vitelliloba*, and much less attenuated. Its suckers are relatively much larger than those of *G. vitelliloba*, and the ventral sucker is situated much farther back along the body. The vitellaria are situated closer to the ventral sucker in *G. alobata* than they are in *G. vitelliloba*; in the former



species they are not lobed, whereas those of *G. vitelliloba* are deeply lobed. The vas deferens of *G. alobata* is much shorter than that of *G. vitelliloba*, which completely crosses the ventral sucker. *G. alobata* has smaller eggs (0.030×0.021) than *G. vitelliloba* (0.035×0.025).

Although, as is evident from this comparison, *G. alobata* and *G. vitelliloba* differ considerably, it is possible that previous records of *G. vitelliloba* from Bombina (Joyeux & Baer, 1953; Walton, 1938) refer, in fact, to *G. alobata*.

G. alobata is much smaller and less attenuated than *G. skrjabini*. The suckers are relatively much larger in the former species and the ventral sucker is relatively much farther back. The vitellaria, ovary and testes of *G. alobata* are situated relatively much nearer the posterior end of the body; in *G. skrjabini* they are grouped close together near the centre of the body. Whereas in *G. alobata* each vitellarium is in the form of a non-lobed mass situated just behind the ventral sucker, each vitellarium in *G. skrjabini* consists of three, large, ovoid lobes arranged one behind the other and situated at a considerable distance behind the ventral sucker. The eggs of *G. alobata* (0.030×0.021) are larger than those of *G. skrjabini* ($0.010-0.015 \times 0.009-0.015$).

TAXONOMIC POSITION

The trematode described here may be assigned to the subfamily Gorgoderinae (Looss, 1899), according to Dawes (1946) and Yamaguti (1958), or to the subfamily Phyllostomatinae Pigulevsky, 1953, according to Pigulevsky (1953).

The flukes have rather attenuated fusiform bodies and possess two testes. They lack a metraterm, pars prostatica and ductus ejaculatorius. They can, therefore, be assigned to the genus *Gorgoderina* (Looss, 1902). Usually, in the diagnosis of the genus, reference is made to the position of the ventral sucker, which is said to be in the anterior third of the body, and to the intestinal caeca, which are said to extend to the posterior extremity of the body. Although these characteristics are not shown by the trematodes from *B. variegata*, they do not appear to be sufficiently important to provide the basis for the erection of a new genus.

Some authors have seen fit to divide the genus *Gorgoderina* into subgenera. Pigulevsky (1953) erected two subgenera, *Gorgoderina* and *Gorgorimma*, based on the position of the vitellaria relative to the ventral sucker; Fernandes (1958) erected three subgenera, *Gorgoderina*, *Gorgorimma* and *Metagorgoderina* on the basis of the vitellarial structure. Using Pigulevsky's or Fernandes's criteria, this parasite can be assigned to the subgenus *Gorgorimma*. Yamaguti (1958) does not subdivide the genus.

Gorgoderina attenuata Stafford, 1902 (from Cort, 1912)

GORGODERINA ATTENUATA STAFFORD 1902

During the fall of 1910 while examining for parasites a number of leopard frogs (*Rana pipiens*) I found in the urinary bladder of nine hosts thirty-seven specimens of *Gorgoderina attenuata* Stafford. The heaviest infection in a single frog was nine. In the following spring Dr. Henry B. Ward kindly turned over to me a number of individuals of the same species collected by A. J. Huntsman from bullfrogs (*Rana catesbiana*) at Rice Lake, Ontario, Canada. These Canadian forms were a little smaller and more attenuated than those from *Rana pipiens*. There can be no doubt in my estimation that these two lots are both *Gorgoderina attenuata*. The size and ratio of the suckers, the shape of the body and size of the egg all correspond. The specimens from the bull-frog are a little less crowded with eggs and are probably a little younger than the other lot. This species is easily recognized on account of the extreme attenuation of the posterior region of the body, and the large size of the acetabulum as compared with the oral sucker (Fig. 7).

On account of the great activity of the worms only the general body relations could be made out in the living material. With the acetabulum firmly attached to the wall of the bladder, the posterior end would often stretch out to two or three times its normal length, become very slender and lash violently from side to side. In no other species of bladder flukes which have been examined alive has this activity been so pronounced. The total length of the living worms was about ten or twelve times their width, and the ventral sucker which was like a large bowl attached at its base, divided the animal into two distinct regions. The anterior region was cylindrical and narrow, comprising about one-third to one-fourth the length of the animal, and the posterior region, which was three-fourths as thick as wide, ended in a rather sharp point.

Sixteen of these specimens, when preserved in alcohol, varied in length from 3.3 mm. to 7.2 mm., while the Canadian material ranged from 3.5 mm. to 4.8 mm. The width depends somewhat on the state of contraction, varying from about 0.35 mm. to 0.56 mm. Measurements of cross sections of three different worms at the region of the anterior testis gave 0.46 mm. in width by 0.35 mm. in thickness, 0.56 mm. in width by 0.46 mm. in thickness, and 0.54 mm. in width by 0.46 mm. in thickness.

The ratio in size of the suckers (*os, vs*, Fig. 7) in *Gorgoderina attenuata* offers an important point in specific diagnosis, and separates it from all the other American species of this genus. The oral sucker in sixteen specimens ranged from 0.26 mm. to 0.33 mm. in diameter, and the acetabulum from 0.6 mm. to 0.82 mm., always having a width noticeably greater than the width of the body. The ratio of the suckers varied in different individuals from 1:2.1 up to 1:3 with an average ratio of 1:2.5. Stafford notes the ratio in *Gorgoderina translucida* as 1:1.5 to 1:1.75 and in *Gorgoderina simplex* as 1:1.3 up to 1:1.5. As noted by this author in these two species, and observed by me in *Gorgoderina simplex*, the edges of the acetabulum do not extend beyond the sides of the body.

The digestive system offers few points of importance in specific diagnosis. The mouth opens ventrally thru the oral sucker into a narrow esophagus about 0.4 mm long. The intestinal ceca are wide apart and close to the lateral margins in the region of the body occupied by the reproductive organs, but back of the posterior testis they approach each other and terminate almost in contact not far from the posterior extremity of the animal.



As in other trematodes the anatomy of the reproductive system offers the clearest specific differences, and will be considered in some detail. Just back of the acetabulum are the paired vitelline glands (*v*, Fig. 7), which are compact organs, lobed but not divided into follicles, and connected by a transvers duct. The ovary (*o*, Fig. 7), is a small round or oval structure close behind the vitellaria and to one side of the body. In seven out of thirteen specimens the ovary was on the right side, the anterior testis to the left and the posterior testis on the same side as the ovary, and in the other six this order was reversed. This arrangement seems to indi-

cate a condition of sexual amphitopy in this species. In a specimen 5.2 mm. in length, the ovary measured 0.32 mm. in length by 0.24 mm. in width. It is wider than thick and lies near the ventral surface. In a cross section which measured 0.31 mm. in width by 0.33 mm. in thickness, the ovary had a width of 0.22 mm. and a thickness of 0.20 mm. (Fig. 4). The ratio of thickness to width is greater than in most trematodes, but less in the next species to be described.

The testes are rather large, slightly elongated structures, lying the one slightly behind the other on opposite sides of the body, the anterior being just behind and on the opposite side from the ovary (t, Fig. 7). They have a greater thickness than width and lie toward the dorsal surface. In the mount for which the ovary was measured the anterior testis had a length of 0.78 mm. and a width of 0.30 mm.; and the posterior testis was 0.93 mm. in length by 0.32 mm. in width. In a cross section 0.47 mm. in width by 0.44 mm. in thickness, the anterior testis measured 0.20 mm. in width by 0.26 mm. in thickness. From the anterior ends of the testes the vasa efferentia pass forward. They run close along the dorsal body wall and unite in front of the vitellaria to form the vas deferens. Just anterior to the attachment of the acetabulum, the vas deferens enlarges into the seminal vesicle, a large pyriform sac filled with sperms. From the dorsal margin of the anterior end of this organ, the ductus ejaculatorius goes directly ventrad to the genital pore, having clustered around the middle of its course the prostate glands, and being of about uniform caliber thruout its length (p, Fig. 5).

The connections of the female reproductive system of *Gorgoderina attenuata* are toward the dorsal surface. The oviduct originates from the middle of the dorsal surface of the ovary, and widens almost immediately into the fertilization space. It soon narrows again and gives off Laurer's canal before entering the region surrounded by the unicellular gland cells of the so-called "shell gland" (Fig. 13). Since Goldschmidt (1909) has conclusively shown that this structure has nothing to do with the production of shell material, I shall follow his lead in discarding the name of shell gland, and call it Mehlis' gland after its discoverer. Within Mehlis' gland and the oviduct becomes thicker walled and changes to the ootpye, which receives the short median duct from the yolk glands.

The beginning of the uterus passes forward, curves over between the yolk glands, and is lost in the mass of coils which fill the posterior body region. The coils and folds of the uterus of *Gorgoderina attenuata* are so complicated that it is impossible to distinguish any definite arrangement. In fact they seem to fill all the available space in the posterior end and this whole region is so crowded with eggs that all the organs are more or less obscured. In front of the vitellaria the uterus makes several voluminous transverse folds, and then passes forward along the mid line of the body to the genital pore. The last part is modified into a short metraterm (mt, Fig. 5), which has slightly thicker walls than the rest of the uterus.

Eggs from living individuals of this species taken from near the genital pore, measured about 0.053 mm. by 0.034 mm., while eggs from the same region of alcoholic specimens were only 0.032 mm. by 0.022 mm. This shows the danger in the study of species having thin shelled eggs of comparing the measurements of eggs from alcoholic material with those from living animals. In the largest eggs fully developed miracidia could be seen turning around within the shell. Such eggs when placed in ordinary tap or distilled water after ten or fifteen minutes began to pop open and liberate the miracidia. In fact when the worm was broken up in water on a slide, and studied under high power, in a short time great numbers of the minute larvae swarmed across the field of vision. They were cylindrical in shape, pointed at one end, and swam with a

rapid whirling motion. Gradually they became distorted and went to pieces, none living more than a few minutes. We can judge from the above observation that in a few minutes after the eggs pass from the salinity of the frog's bladder into the surrounding water the change in osmotic pressure liberates the miracidia, which start in their search for a snail host. Whether they can live for more than a few minutes it would take further observations and experiments to decide. It may be of value to note in this connection that for the demonstration of the miracidia stage of trematodes to classes, there is probably no material more easily obtained and better for study than the larvae which are liberated from the eggs of the frog bladder flukes. As in all the forms of this group I have ever seen, the eggs are in an advanced stage of development. I am confident that this experiment would work with any of these species.

Gorgodorina aurora ~~sp.~~ *sp. n.* Ingles, 1936
(Plate XVI, fig. 2)

This species has been known for a number of years but previously has been considered to be only the young adult form of *G. multilobata* Ingles and Langston. Continued research based on collections made at widely separated stations and at different times of the year have convinced the author that it is not the young adult of *G. multilobata* but is a distinct species the description of which follows here.

Host: *Rana aurora*.

Location: Urinary bladder.

Localities: San Joaquin Valley-San Francisco Bay region.

Type specimen: U. S. National Museum Helm. Coll. No. 8932.

Average length and width of ten specimens, 6.2 mm. and 0.65 mm. respectively; range in length 5. mm. to 8. mm. Shape, very slender, sub-cylindrical in cross section. Ratio of width to length varies between 1:8.4 and 1:12, average ratio being 1:9.5. Oral sucker nearly circular and sub-terminal, averages 0.31 mm. in length, varies between 0.25 mm. and 0.36 mm. Esophagus short and narrow. Caeca long and equal. Acetabulum averages 0.65 mm. in length and varies between 0.52 mm. and 0.78 mm. Ratio of length of oral sucker to acetabulum varies between 1:2 and 1:2.4. Ovary, kidney or heart-shaped with a mass of larger cells in its center; length between 0.25 mm. and 0.41 mm.; width, 0.22 mm. to 0.35 mm. Vitellaria irregularly lobed. Uterus fills all space between and behind caeca; it extends anteriorly to vitellaria extra-caecally on right side, on left it extends anteriorly to ovary. Testes, longer than wide; anterior one varies in length between 0.39 mm. and 0.71 mm.; width varies 0.30 mm. to 0.43 mm.; posterior one varies between 0.31 mm. and 0.82 mm. in length and 0.22 mm. and 0.40 mm. in width. Eggs from ten specimens average 26μ in length by 18μ in width. Their length and width vary between 22μ and 32μ and between 15μ and 22μ respectively.

Gorgodorina aurora most closely resembles *G. attenuata*. Dr. Cort kindly sent the author five specimens of the latter species for comparison with the new species. Several differences were at once evident. *G. attenuata* Stafford is a much narrower fluke in proportion to its length. The ratio of the oral sucker to the acetabulum is different for the two species; the smallest ratio found in ten specimens of *G. aurora* is 1:2.4, while the largest ratio for sixteen specimens of *G. attenuata* is 1:2.3. *G. aurora* differs from *G. multilobata* in not having regularly lobed vitellaria, in its smaller size, in the different ratios of the oral sucker to the acetabulum, and in the different ratio of

the length to the width. *G. aurora* differs from *G. cedroi* Travassos and *G. cryptorchis* Travassos in the ratio of the oral sucker to the acetabulum, and in the difference of its egg size.



Gorgoderina bilobata Rankin, 1937

Gorgoderina bilobata differs from G. tenua as follows: Larger size with correspondingly larger body measurements, long esophagus, thick uterine folds between acetabulum and vitellaria, small genital pore, two-lobed vitellaria, and larger egg size. It differs from G. multilobata Ingles and Langston, 1933, by the absence of spines around oral sucker and acetabulum, more equal size of suckers, smaller number of vitelline lobes, fewer number of uterine folds, and larger size of eggs. It differs from G. aurora Ingles, 1936, by the smaller body ratios, nearly equal suckers, vitellaria fairly regularly bilobed, and larger size of eggs. It differs from G. attenuata Stafford, 1902, by the smaller size of the eggs, larger size of suckers, and ratios between organs. It may be distinguished from G. carli Baer, 1930, G. cedroi, and G. cryptorchis Travassos, 1924, G. simplex Looss, 1899, G. intermedia Holl, 1928, and G. parvicava Travassos, 1919, by the XI lobate vitellaria and the ratios between organs. Finally it differs from G. translucida Stafford, 1902, by the smaller size of the eggs, comparatively equal size of suckers, and intra and extra-caecal development of the uterus.



Host: Ambystoma opacum
Desmognathus f. fuscus
Pseudotriton m. montanus
P. m. ruber

Ref: Jour. Parasit.,

Fig. 2. GONGODERINA (NEOGONGODELINA) CHILENSIS n. sp.

Dionis, 1947

Figuras 1-3

Medidas expresadas en milímetros	[0,000]:	
	ej. a	ej. 1
Longitud total	2,759	3,630
Ancho máximo	396	462
Diámetro del cotilo	238	330
Diámetro del acetábulo	554	634
Distancia intercotilo-acetabular	198	264
Longitud del esófago	132	134
Longitud de los ciegos intestinales	2,231	3,168
Distancia del fondo de los ciegos al extremo posterior	132	—
Testículo anterior	—	—
largo	132	198
ancho	158	168

Testículo posterior	—	—
largo	198	215
ancho	136	160
Vesícula seminal	—	—
largo	168	190
ancho	106	132
Ovario	—	—
largo	211	291
ancho	198	224
Vitelógeno derecho	—	—
largo	220	223
ancho	058	058
Vitelógeno izquierdo	—	—
largo	234	240
ancho	058	060
Huevos	—	—
largo	027	027
ancho	017	017

Descripción (figura 1). — Cuerpo alargado, fusiforme. La relación entre sus ejes transversos y longitudinal es 1:7,44. La cutícula es lisa, sin espinas. La ventosa oral o cotilo es pequeña y terminal y se abre en un corto esófago, no hay faringe ni glándulas esofágicas, la división en dos ramas intestinales se efectúa a nivel de la vesícula seminal y los ciegos alcanzan casi al extremo del cuerpo, la relación entre la longitud total de éste y la de los ciegos intestinales es 1:0,88.

Acetábulo en la última porción del tercio anterior del cuerpo. La relación cotilo-acetabular es 1:2,1, pero hay que tener presente que todos los ejemplares ofrecen este último algo alargado por comprensión. La distancia cotilo-acetabular, medida entre los centros de las ventosas está en relación con la longitud del cuerpo, tomada como unidad, como 1:0,46, puesto que esa distancia es en el ejemplar a igual a 0mm,594. La relación entre la longitud del cuerpo y el diámetro de la ventosa ventral es 1:0,2.

Aparato genital en su mayor parte postacetabular. Los testículos son posteriores al ovario, situados ambos sobre una misma línea longitudinal, paramediana e izquierda. El anterior está casi junto al ovario y separado del posterior por casi el largo de éste. El testículo posterior es ligeramente más grande que el anterior, aquél está separado del extremo distal del cuerpo por una distancia igual aproximadamente a tres veces su mayor diámetro. La vesícula seminal es globulosa, situada a la altura de la confluencia de los ciegos, se abre al exterior por un corto ducto muy cerca de la línea mediana ventral.

El ovario, de forma trapezoidal con la gran base hacia arriba, está situado a la derecha y es mayor que cualquiera de los dos testículos. Los vitelógenos situados por delante del ovario y por detrás de la línea de unión del primer tercio del cuerpo con el siguiente, forman dos glándulas alargadas, dispuestas en herradura, con la concavidad hacia atrás, colocadas en la mitad izquierda en tal forma que el extremo distal de la rama derecha se pone en contacto con el ovario. Cada una de las ramas se dividen transversalmente por uno o dos estrangulamientos en dos o tres lóbulos, situados uno a continuación de otro, sobre el eje longitudinal. Puede suceder que cada una de ellas sea bilobulada o, como ocurre generalmente, una bilobulada y otra trilobulada (figs. 2 y 2'). Los lóbulos presentan a su vez pliegues que no pasan de ser superficiales. El útero está muy desarrollado, con ansas intra y extracelulares. Desciende formando bucles transversales hasta el extremo posterior del cuerpo, sobrepasando el límite de los fondos de ciego intestinales, para volver a subir en igual forma hasta alcanzar el acetábulo. Su extremo, o metatrémico, llega hasta el orificio genital, donde inmediatamente anterior a la ventosa ventral se abre justo al ducto de la vesícula seminal. El útero está totalmente lleno de huevos, que en nuestros ejemplares están coloreados de amarillo castaño; la relación entre el largo y el ancho es 1,0,63 (figura 3).



Figuras 1-3

Gorgoderina chilensis n. sp.

1. Ejemplar tipo, montado en balsamo, arqueado a nivel del acetábulo, apareciendo visible la cara dorsal en sus dos tercios posteriores. La escala representa 1 mm. 2 y 2'. Los vitelógenos de dos ejemplares cotípos. La escala representa 100 μ . 3. Huevos en el útero. La escala representa 50 μ .

Huésped: *Rhinoderma darwini* Duméril & Bibron.

Organo parasitado: Vejiga urinaria.

Localidad: Barra del Río Bueno, provincia de Valdivia, Chile.
Tipo: Colección del Museo de Historia Natural de Montevideo.

Nuestra especie, la quinta sudamericana, pertenece al subgénero *Neogorgoderina*, como la mayoría de las especies del género. Entre las integrantes de él se distingue de *G. parvicava* Travassos, 1919, *G. cryptorchis* Travassos, 1924, *G. cedroi* Travassos, 1924, *G. intermedia* Holl, 1928 y *G. carli* Baer, 1930, por presentar los vitelógenos con cisuras.

De las especies que presentan sus vitelógenos lobulados, y de todas en general, se diferencia principalmente por la disposición particular de tales glándulas, pues mientras que en nuestra especie son éstas paramedianas, situadas a la izquierda del plano sagital, en todas las demás especies se hallan precisamente cortadas por ese plano. En particular, se diferencia de *G. capsensis* Baer & Joyeux, 1934, por poseer el poro genital mediano, de *G. attenuata* (Staford, 1902) y de *G. schistorchis* Steelman, 1938, por la ausencia de testículos lobulados y de *G. aurora* Ingles, 1936, por poseer el ovario de forma oblonga. De *G. simplex* (Looss, 1899) se diferencia por el testículo anterior muy cercano al ovario y por la evidente desigualdad existente entre sus diversas relaciones, particularmente la dimensión de los huevos y la relación entre la longitud y el ancho. Por las distintas relaciones cotilo-acetabular y transverso-longitudinal, así como por el distinto tamaño de los huevos, difiere finalmente de *G. bilobata* y de *G. tenua*, ambas de Rankin, 1937.

Gorgoderina diaster Lutz, 1926

Gorgoderina diaster Lutz 1926

Two specimens of this species were collected from each of two *B. marinus* captured 15 km west of Neiva, Huila, Colombia. The four specimens agreed with the original description of *G. diaster* except that the snout ratio ranged from 1:1.35 to 1.30 as opposed to 1:1.3. Fernandes (1958) reported *G. diaster* from *Rana palmipes* and *Pseudis paradoxa* (type host) from Maracay, Venezuela (type locality). *Bufo marinus* is a new host record and Colombia is a new locality for *G. diaster*. Two specimens have been deposited in the Manter Lab. No. 20250.

From Brooks, 1976

Fifty eight parasites of this species were recovered from the urinary bladder of eleven specimens of *Rana cyanophlyctis*, out of two hundred and fifteen examined. Body measuring $4.69-5.72 \times 1.12-2.05$, thick, anterior and posterior ends narrow, broadest in the middle. Cuticle thick, aspinose. Oral sucker measuring $0.54-0.65 \times 0.56-0.68$, terminal. Ventral sucker measuring $0.84-0.92 \times 0.93-1.01$, larger than oral sucker, situated $1.42-1.51$ from anterior end i.e. one fourth of the body length from anterior end. Suckers ratio 1:1.5. Pharynx and oesophageal glands absent. Oesophagus measuring $0.27-0.35 \times 0.053-0.06$, smaller than oral sucker. Intestinal bifurcation measuring $0.84-0.91$ from anterior end, immediately in front of ventral sucker. Caecal ends measuring $0.12-0.91$ from the posterior end. Genital opening measuring $0.19-0.21$ away from the median line, submedian, ventral sinistral, in between the intestinal bifurcation and anterior margin of ventral sucker. Excretory bladder "Y" shaped; stem long, median slender, sigmoid, intertesticular, dividing into two short cornua on the anterior level of left testis. Testes oblique, irregularly lobed, situated in the middle third of the body. Left testis measuring $0.82-0.98 \times 0.22-0.34$, anterior, equatorial, overlapped by left caecum. Right testis measuring $0.89-1.001 \times 0.21-0.32$, posterior, post-ovarian. Intertesticular distance measuring $0.98-1.31$. Vesicula seminalis measuring $0.83-0.96 \times 0.103-0.128$, 'S' shaped, in between intestinal bifurcation and ventral sucker, transversely situated. Ovary measuring $0.53-0.67 \times 0.29-0.35$, dextral, elongated, lobated, preequatorial, in front of right testis. Oviduct arising from the anterodorsal side of the ovary, receiving the common vitelline duct from the triangular yolk reservoir, giving origin to uterus at this point; junction of oviduct, uterus, common vitelline duct surrounded by shell gland cells. Laurer's canal meeting the oviduct in middle. Uterus filling all the available postacetabular space. Vitelline glands measuring $0.04-0.35 \times 0.21-0.35 \times 0.21-0.23$, oval, directly posterior to ventral sucker; intercaecal, drawn apart, with smooth surface. Intrauterine eggs measuring $0.021-0.032 \times 0.024-0.026$, oval; distal eggs embryonated.

REMARKS

Gorgoderina ellipticum n. sp. differs from other species of the genus but resembles *G. schistorchis* Steelman, 1938; *G. tenua* Rankin, 1937; *G. diaster* Lutz, 1926; *G. cedroi* Travassos, 1924; *G. cryptorchis* Travassos, 1924; *G. carli* Baer, 1930 and *G. parvicava* Travassos, 1920 in having vitellaria, directly posterior to ventral sucker. The new species differs from *G. schistorchis* in having oval vitellaria, bigger body, smaller suckers ratio, absence of papillae on suckers, oesophagus smaller than oral sucker, lobate ovary; from *G. tenua* in having bigger body, absence of oesophageal glands, dextral ovary, oval vitellaria, anterior testis sinistral, absence of oesophageal glands; from *G. carli* in having lobate ovary and testes, round ventral sucker, bigger eggs. The new species further differs from *G. diaster* and *G. permagna* in having oval vitellaria and from *G. parvicava* in having ventral sucker larger than oral sucker and much smaller body. Lastly *G. ellipticum* n. sp. differs from all the species in having transversely situated 'S' shaped vesicula seminalis and elliptical shape of the body.

Host	: <i>Rana cyanophlyctis</i>
Location	: Urinary bladder
Locality	: Chhindwara M. P. INDIA

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GORGODERINA ELLIPTICUM N. SP.—ventral view.

GORGODERINA INFUNDIBULATA N. SP. (FIG. 3) DWIVEDI, 1967

Thirteen parasites of this species were recovered from the urinary bladder of twelve specimens of *Bufo melanostictus* out of thirty eight examined. Body measuring $5.58-6.01 \times 1.04-1.53$, semicylindrical, thick, anterior part narrow, posterior part broad. Cuticle thick, aspinose. Oral sucker measuring $0.56-0.73 \times 0.43-0.67$, terminal. Ventral sucker measuring $1.01-1.20$, infundibulum shaped, drawn out from the body surface, situated $2.08-2.22$ from anterior end, i.e. one third of the body length from the anterior end. Pharynx and oesophageal gland absent. Oesophagus measuring $0.41-0.59 \times 0.058-0.061$, smaller than oral sucker. Intestinal bifurcation measuring $0.98-1.12$ in front of ventral sucker, $1.02-1.201$ from anterior end. Caecal ends measuring $0.61-0.73$ from the posterior end. Genital opening measuring $0.061-0.067$ away from the median line, submedian, ventral, sinistral, immediately below the intestinal bifurcation. Excretory bladder similar to that of *G. ellipticum* n. sp. Testes oblique, irregularly lobed, unequal, situated in the middle third of the body. Left testis measuring $0.641-0.784 \times 0.31-0.46$, anterior, half the size of right, overlapped by left caecum. Right testis measuring $1.22-1.49 \times 0.45-0.47$, posterior, immediately behind the ovary. Intertesticular distance measuring $0.335-0.536$. Vesicula seminalis measuring $0.34-0.43 \times 0.11-0.13$, bilobed, in between intestinal bifurcation and ventral sucker, inclined upon the median axis of body. Ovary measuring $0.39-0.43 \times 0.19-0.26$, dextral, oval, smooth, equatorial in between right vitelline lobe and right testis, overlapped by right caecum. Oviduct, vitelline duct, yolk reservoir, Laurer's canal shell gland complex similar to that of *G. ellipticum* n. sp. Vitelline glands measuring $0.201-0.208$, drawn apart, oval, directly posterior to ventral sucker, smooth, inter-caecal. Intrauterine eggs measuring $0.036-0.042 \times 0.022-0.024$; distal eggs embryonated.

REMARKS

G. infundibulata n. sp. in the situation of vitellaria may be included in the same group of species in which *G. ellipticum* n. sp. and *G. symmetriorchis* n. sp. are included. In this group it differs from *G. schistorchis* in having oval vitellaria, body two times bigger, suckers without papillae, oesophagus smaller than oral sucker; from *G. tenua* in having oval non-lobate vitellaria, larger body size, ovary dextral, bigger eggs; from *G. cryptorchis* in having ovary smaller than testes, absence of oesophageal glands; from *G. carli* in having lobed testes and much bigger size of the eggs. New species further differs from *G. diaster* in having smooth, oval, distinct vitellaria and ovary smaller than testes; from *G. permagna* in having non-lobate vitellaria and from *G. parvicava* in having ventral sucker larger than oral sucker and much smaller body. The infundibulum shape of ventral sucker drawn out from the body surface and left testis half the size of right testis are the interesting features of the new species not reported in other species of the genus.

The three new species *G. ellipticum* n. sp., *G. symmetriorchis* n. sp. and *G. infundibulata* n. sp. differ from each other in the shape of the body and ventral sucker; shape and size of the testes and ovary;



GORGODERINA INFUNDIBULATA N. SP.—dorsal view.

situation of genital opening; nature and disposition of vesicula seminalis, vitelline glands and size of the eggs. These features the writer submits, justify the allocation to new species.

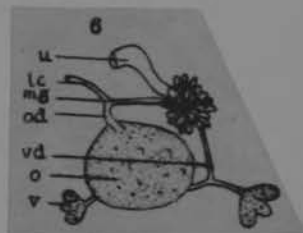
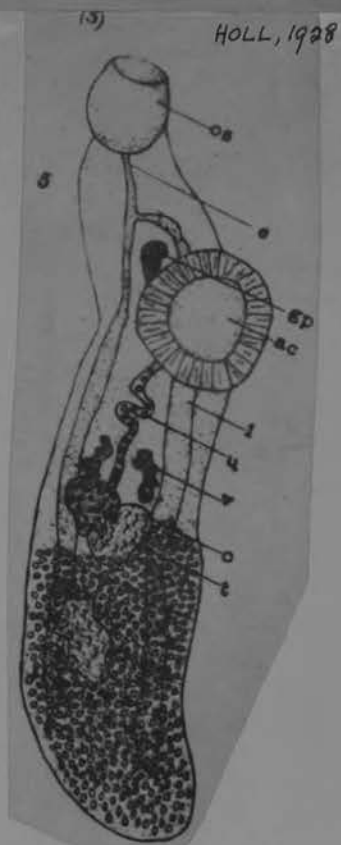
Host : *Bufo melanostictus*
Location : Urinary bladder
Locality : Chhindwara, M. P. India

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Fig 5.—*Gorgoderina intermedia*, entire specimen flattened. × 105.

Fig 6.—*Gorgoderina intermedia*, reconstruction of female genital apparatus from in toto and sections. × 105.

Gorgoderina intermedia Holl, 1928



FISCHTHAL AND KUNTZ, 1965

Gorgoderina malaysiensis n. sp. (Figs. 1, 2)HOST: *Rana kuhli* (Ranidae).

HABITAT: Small intestine.

LOCALITY: Ralau, North Borneo.

DATE: 18 September 1960.

TYPES: U.S.N.M. Helm. Coll. No. 60933 (one slide of holotype and one of paratype).

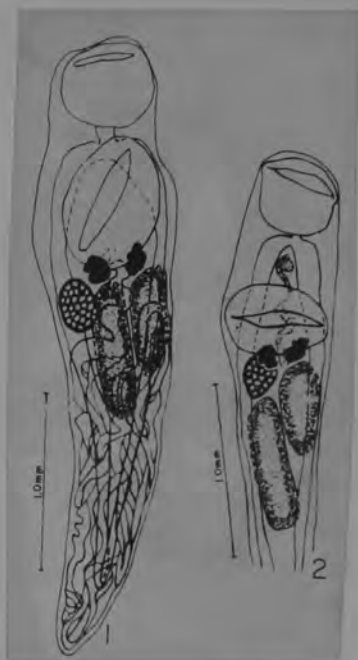
DIAGNOSIS (based on one complete specimen and one with part of posttesticular body missing): Body 3,574 (holotype) by 675 to 844 elongate, smooth; anterior extremity to posterior margin of posterior testis 2,140 to 2,194; forebody 568 to 720, hind body 2,239; posttesticular space 1,381; postcecal space 422. Oral sucker 444 to 498 by 475 to 544, slightly wider than long, subterminal; acetabulum 453 to 567 by 625 to 767, raised from body, much elongate transversely, aperture transverse; sucker length ratio 1:1.02 to 1.14. **ESOPHAGUS** (holotype) 148 long.

Testes two, at mid-body, oblique, levels overlapping with left testis more anterior, in contact or nearly so, smooth, much longer than wide, dorsal to uterus; anterior testis 545 to 614 by 228 to 239, just overlapping level of posterior margin of acetabulum, dorsal to left cecum but partly intercecal and may also be partly extra-cecal, anterior margin in contact with or just overlapping left vitellarium ventrally; posterior testis 767 to 775 by 222 to 224, lying 92 to 192 postacetabular, intercecal but may just overlap edge of right cecum dorsally, anterior margin in contact with right vitellarium or with ovary

Seminal vesicle (paratype) 96 by 107, bulbous, preacetabular, postbifurcal, median. Genital pore (paratype) 103 postbifurcal, 110 preacetabular, median.

Ovary 250 to 316 by 184 to 202, just overlapping posterior margin of acetabulum to 16 postacetabular, smooth, oval, dextral, partly intercecal and partly ventral to right cecum, lying posterodextral to right vitellarium and anterodextral to and in contact with posterior testis (holotype) or mostly between right vitellarium it overlaps ventrally and posterior testis it just overlaps dorsally (paratype). Vitellaria with five to six superficial lobes, overlapping posterior part of acetabulum, right vitellarium 173 to 202 by 121 to 151, left vitellarium 173 to 210 by 125. Uterus filling posttesticular space, extending to body margins as far forward as ovarian level, mainly ventral to gonads and vitellaria where overlapping them, with undulations ascending more or less in midline to genital pore. Twelve eggs measuring 28 to 36 by 16 to 19, numerous, with fully developed miracidia.

DISCUSSION: Pereira and Cuocolo (1940) divided the genus *Gorgoderina* Looss, 1902, into two subgenera, *Gorgoderina* Looss, 1902, and *Neogorgoderina*. Dollfus (1958), Yamaguti (1958), and Fernandes (1959) stated that the latter subgenus should be suppressed as its type species is the type of the genus. Dollfus also questioned the validity of creating subgenera on the basis of the lobation of the vitellaria or its absence. Pigulevsky (1953) recognized two subgenera in the genus: *Gorgoderina* (vitellaria far posterior to the acetabulum); *Gorgorimma* Pigulevsky, 1952 (vitellaria



just posterior to acetabulum). Our form fits the latter subgenus. In the key to the species of *Gorgorimma* given by Pigulevsky (1953) it comes closest to *Gorgoderina* (*Gorgorimma*) *tenua* Rankin, 1937, from a plethodontid salamander from North Carolina but differs from the latter in geographical distribution and in having the testes greatly elongate and more anteriorly placed, vitellaria overlapping dorsally the posterior part of the acetabulum, acetabulum much elongate transversely, and genital pore postbifurcal. Yamaguti (1958) included *Gorgorimma* in *Gorgoderina*. Fernandes (1959) recognized three subgenera of the genus *Gorgoderina*: *Gorgoderina* (vitellaria lobed superficially or deeply, not divided into

free acini with separate ducts); *Gorgorimma* (vitellaria compact, unlobed); *Metagorgoderina* (vitellaria deeply lobed, divided into free acini, each with a separate duct connecting the right or left vitelline ducts). Our form fits Fernandes' description of the subgenus *Gorgoderina* and can be differentiated from the species he listed therein as discussed above in relation to Pigulevsky (1953). The presence of our specimens in the small intestine rather than the urinary bladder appears to be unusual for the genus and may be due to postmortem wandering or contamination during host examination.

Gorgoderina (Gorgoderimma) megacysta n. sp. Mañé-Garzón and González, 1978

El cuerpo es alargado, subcilíndrico, seis veces más largo que ancho; el extremo posterior es afinado; mide 3.97 mm. a 4.84 mm. de largo por 0.645 mm. a 0.839 mm. de ancho máximo tomado a nivel del acetábulo. La cutícula es lisa y fina, de grosor uniforme. El acetábulo más pequeño que la ventosa oral, subsférico, está situado en el tercio anterior del cuerpo; mide 0.287 mm. a 0.340 mm. de diámetro.

La ventosa oral es subterminal, ovoidea, musciosa, mide 0.44 mm. a 0.592 mm. de largo por 0.473 mm. a 0.592 mm. de ancho. No hay faringe. El esófago es corto, sin células glandulares adyacentes. Los ciegos desde su nacimiento en el esófago son anchos, afinándose luego para extenderse con un grosor uniforme hasta muy cerca del extremo posterior del cuerpo. El poro excretor es terminal y presenta una vesícula excretora.

El poro genital es pequeño, lateral, situado en la mitad de la distancia que separa el acetábulo de la ventosa oral. Los testículos son ovoideos, subiguales, postacetabulares, dispuestos en tandem y de mayor tamaño que el ovario. El testículo anterior mide 0.178 mm. a 0.325 mm. de largo por 0.266 mm. a 0.400 mm. de ancho y el posterior 0.267 mm. a 0.311 mm. de largo por 0.252 mm. a 0.370 mm. de ancho. Se encuentran separados entre sí por varias ansas uterinas, mediando una distancia de 0.222 mm. entre ambos. El testículo anterior se encuentra separado del ovario también por varias ansas uterinas, mediando entre él y el ovario una distancia de 0.148 mm. La vesícula seminal es muy grande, subsférica preacetabular y compacta, mayor que el acetábulo mide 0.236 mm. a 0.400 mm. de largo por 0.222 mm. a 0.400 mm. de ancho.

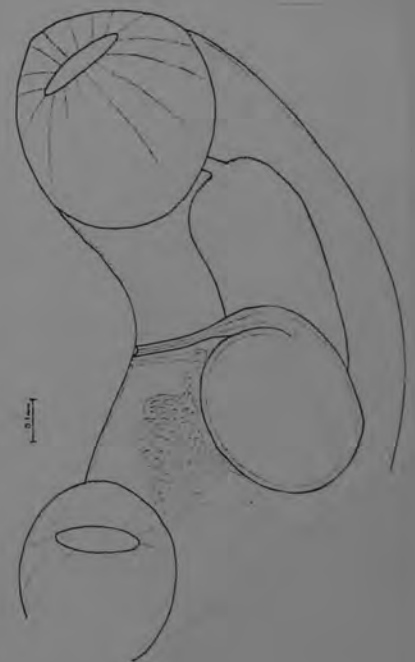
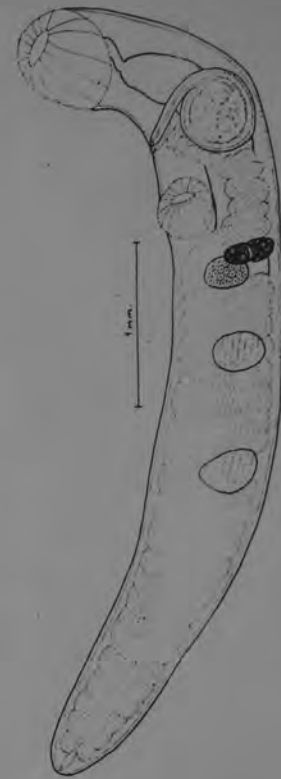
El ovario es ovoideo, pretesticular, postacetabular, ventral, mide 0.163 mm. a 0.269 mm. de largo por 0.192 mm. a 0.237 mm. de ancho. Glándula de Mehlis presente. Las glándulas vitelógenas son compactas, pequeñas, situadas dorsalmente y por delante del ovario; miden 0.148 a 0.207 mm. de largo por 0.178 a 0.222 mm. de ancho. El útero forma numerosas ansas descendentes y luego ascendentes que ocupan casi los dos tercios posteriores del cuerpo, terminando en un metratermo junto al por genital masculino. Los huevos sumamente numerosos, son pequeños, mide 0.016 mm. a 0.024 mm.

Huésped: *Leptodactylus ocellatus* (L.)

Organo: Vejiga urinaria.

Localidad: Laguna del Diario, Departamento de Maldonado, Uruguay.

Tipo: Depositado en la colección Helmintológica de la Facultad de Humanidades y Ciencias, Nros. H-1085. Medidas del tipo: Largo total 4.39 mm.; acetábulo 0.296 mm. x 0.326 mm.; ventosa oral 0.444 mm. x 0.473 mm.; testículos 0.325 mm. x 0.400 mm.; ovario 0.163 mm. x 0.296 mm.; huevos 0.016 mm. x 0.024 mm. Paratipos Nros. H-1086-1096 depositados en la misma colección.



(over)

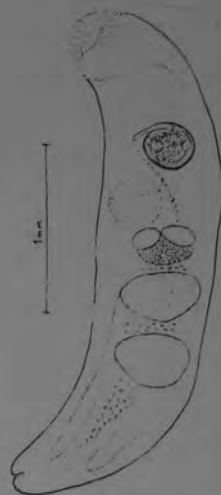


DISCUSSION

Gorgoderina (*Gorgoderimma*) *megacysta* n. sp. se caracteriza por presentar una enorme vesícula seminal cuyo tamaño es mayor al del acetábulo. El subgénero *Gorgoderimma* cuenta en Sudamérica con dos especies: *G. (Gorgoderimma) parvicava* Travassos, 1922 parásita de *Leptodactylus ocellatus* (L.), *Leptodactylus pentadactylus* (Laur.), *Bufo marinus* (L.), *Rana Palmides* Spix, *Bufo crucifer* Wied, *Bufo paracnemis* Lutz, y *Pseudis paradoxa* (L.), de Brasil, Venezuela y Paraguay y Uruguay; y *G. (Gorgoderimma) cedroi* Travassos, 1924 parásita de *Eloisa nasus* (Licht.) de Brasil (Fernandes, 1958).

De ambas especie se diferencia por poseer estas una vesícula seminal pequeña. De *G. (G.) cedroi* se diferencia además por presentar el acetábulo menor que la ventosa oral. Sus diferencias son *G. (G.) parvicava* son el de poseer esta especie un tamaño mucho mayor y en la pequeñez de su vesícula seminal.

En el curso de 26 autopsias realizadas en *Leptodactylus ocellatus* en 14 ejemplares se recogieron 41 vermes, los cuales fueron fijados inmediatamente de ser extraídos de la vejiga urinaria en AFA caliente. Lavados y coloreados con carmín acético y montados en bálsamo de Canadá, previa deshidratación. Las medidas fueron realizadas sobre 10 ejemplares y están expresadas en milímetros (mm.). Los dibujos fueron realizados con cámara clara.



SUMMARY

Two species of Digenea Gorgoderidae parasites of the urinary bladder of the common frog of South America *Leptodactylus ocellatus* (L.) are described: *Gorgoderina (Gorgoderimma) parvicava* Travassos, 1922 y *Gorgoderina (Gorgoderimma) megacysta* n. sp. This last species is characterized by the great size of the seminal vesicle.

3. *Gorgoderina parvicava* Travassos 1920

(Lam. I: fig. 7)

El cuerpo es subcilíndrico con el extremo anterior redondeado y el posterior agudo. La cutícula es lisa, sin espinas. El largo del cuerpo es de 3.02-9.70 mm y el ancho del mismo de 0.62-1.52 mm. La ventosa oral es subterminal y de forma esférica. Mide 0.50-0.90 mm de diámetro. El acetábulo es prececal, intercecal y de forma esférica. El esófago es corto. Las cruras intestinales llegan hasta casi el extremo posterior del cuerpo.

Posee dos testículos post-ovarianos que abarcan la zona intercecal y cecal. El testículo anterior está situado en la región ecuatorial y el posterior por debajo de dicha región. El testículo anterior mide 0.25-0.60 mm de diámetro antero-posterior por 0.40-1.0 mm de diámetro transversal. El testículo posterior mide 0.28-0.51 mm de diámetro antero-posterior por 0.30-1.0 mm de diámetro transversal. No posee bolsa del cirro¹.

El ovario es post-acetabular, pretesticular e intercecal. Mide 0.28-0.50 mm de diámetro antero-posterior por 0.25-0.80 mm de diámetro transversal. El útero se extiende desde la zona preacetabular hasta la región posterior del cuerpo y describe numerosas asas que abarcan las zonas intercecal-cecal y extracecal. Las glándulas vitelógenas están constituidas por folículos compactos preovarianos y post-acetabulares dispuestos a cada lado de la línea media del cuerpo. Cada folículo mide 0.10-0.25 mm de diámetro antero-posterior por 0.12-0.45 mm de diámetro transversal. Los huevos miden 0.011-0.027 mm de largo por 0.010-0.020 mm de ancho.

¹ En la descripción de *Gorgoderina parvicava* que figura en *Neotropica* 11 (34): 21, se menciona la presencia de la bolsa del cirro. Se aprovecha esta oportunidad para enmendar dicho error.

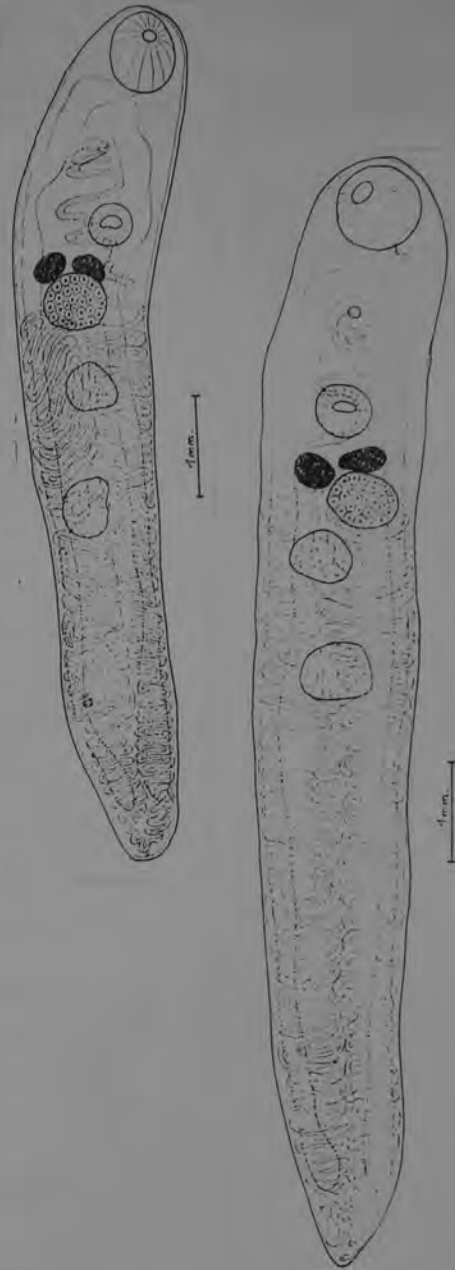


Gorgoderina (Gorgoderimma) parvicava Travassos, 1922

El cuerpo es alargado subcilíndrico con el extremo anterior redondeado y el posterior afinado; mide de largo entre 8.22 mm. y 11.48 mm. por 2.11 mm. a 1.07 mm. de ancho a nivel del acetábulo.

La cutícula es lisa, sin espinas. El acetábulo es menor que la ventosa oral y está situado en el tercio anterior del cuerpo y por delante del complejo genital; mide de 0.778 mm. de diámetro. La ventosa oral es subterminal; mide 0.963 mm. a 0.444 mm. de diámetro. Le continúa un esófago muy corto casi siempre difícil de observar con claridad, circunstancia ésta que se brinda cuando la fijación se realiza con un aplastado en perfil o semiperfil del cuerpo. Mide 0.036 mm. de largo. Los ciegos, largos y ancho, llegan al extremo posterior guardando distancias de 0.629 mm. a 0.296 mm. entre el fondo del ciego y el extremo posterior.

El poro genital es mediano y la vesícula seminal es pequeña, con torneada, situados por debajo de la bifurcación cecal, de situación intracecal; aparenta una forma triangular a vértice en el poro genital. Los testículos, algo más pequeños que el ovario, son irregularmente redondeados y separados uno del otro por varias ansas uterinas, miden el anterior de 0.778 mm. a 0.370 mm. de ancho por 0.963 mm. a 0.370 mm. de largo; el posterior mide de 0.704 mm. a 0.555 mm. de ancho por 0.963 mm. a 0.370 mm. de largo. El ovario bien redondeado, separado de los testículos por alguna ansa uterina, mide de largo 0.814 mm. y 0.481 mm.; y 0.703 mm. a 0.185 mm. de ancho. Las glándulas vitelógenas son compactas, sin lobulaciones, de contornos regulares y de forma elíptica o redondeados; mide la derecha de 0.389 mm. a 0.148 mm. a lo largo por 0.481 mm. a 0.296 mm. a lo ancho; la izquierda 0.333 mm. a 0.185 mm. de largo por 0.481 mm. a 0.370 mm. de ancho. Espermateca ausente. Canal de Laurer presente. El útero está formado por un sinuoso tramo descendente generalmente transversales y oblicuos que descienden hasta el extremo posterior de donde ascienden en la misma forma, extra intracecales hasta la altura del ovario donde con un trayecto menos sinuoso llega al pro genital. Los huevos operculados, miden de 0.045 mm. a 0.027 mm. de largo por 0.027 mm. a 0.010 mm. de ancho.



Habitat: vejiga urinaria de *Leptodactylus ocellatus* (L.).

Procedencia: Bañado Tropa Vieja, Departamento de Canelones, Uruguay.

Ejemplares depositados en la Colección Helminológica del Departamento de Zoología Invertebrados, Facultad de Humanidades y Ciencias, Nros. 1061-1084.

DISCUSION

G. (G.) parvicava Travassos, 1921 es un parásito que se encuentra con relativa frecuencia en la rana comestible *Leptodactylus ocellatus* (L.) muy probablemente en toda su área de distribución, y que se individualiza fácilmente por su gran tamaño, sus vitelógenos compactos y la pequeñez de su vesícula seminal.

From Mañé-Garzón and González, 1978

GORGODERINA SYMMETRIORCHIS ~~N. SP.~~ (FIG. 2) DWIVEDI, 1967

Nineteen parasites of this species were recovered from the urinary bladder of twelve specimens of *Rana limnocharis* out of fifty two examined. Body measuring $2.81-3.39 \times 0.82-0.98$, elongate, cylindrical. Cuticle thick, aspinose. Oral sucker measuring $0.48-0.53$ in diameter, terminal, round. Ventral sucker measuring $0.72-0.87 \times 0.53-0.65$; situated $1.42-1.56$ from anterior end very strong. Suckers ratio 1:1.6. Pharynx and oesophageal glands absent. Oesophagus measuring $0.099-0.12 \times 0.53-0.65$, smaller than oral sucker. Intestinal bifurcation measuring $0.54-0.66$ from anterior end. Genital opening measuring $0.33-0.37$ from anterior margin of ventral sucker; median, ventral, just below the intestinal bifurcation far in front of ventral sucker. Excretory bladder 'Y' shaped; stem long, median, thin, slender, sigmoid, passing in between the two testes, bifurcating into two short cornua on the level of anterior margin of testes. Testes oval, symmetrical, applying each other, almost of same size, intercaecal or partly overlapped by right and left caecum on the outer margins, post-equatorial, voluminous, having smooth surface. Left testis measuring $0.79-0.89 \times 0.37-0.39$. Right testis measuring $0.77-0.88 \times 0.33-0.42$, postovarian. Intertesticular space measuring $0.012-0.023$. Vesicula seminalis measuring $0.79-0.84 \times 0.091-0.112$, 'S' shaped in between intestinal bifurcation and ventral sucker, parallel to the length of the body. Ovary measuring $0.29-0.34 \times 0.16-0.18$, dextral, oval, smooth, overlapped by right caecum, post-equatorial. Oviduct, vitelline duct, yolk reservoir, Laurer's canal, shell gland complex similar to that of *G. ellipticum* n. sp. Vitelline glands measuring $0.21-0.23$ in diameter, directly posterior to ventral sucker, spherical, intercaecal. Intrauterine eggs measuring $0.040-0.0408 \times 0.024-0.026$, oval; distal eggs embryonated.



GORGODERINA SYMMETRIORCHIS N. SP.-dorsal view.

REMARKS

Gorgoderina symmetriorchis n. sp. in having vitellaria directly posterior to ventral sucker, may be included in the group of species which includes *G. ellipticum* n. sp. The new species differs from *G. schistorchis* in having spherical vitellaria, smaller suckers ratio, absence of papillae on suckers, oesophagus smaller than oral sucker, smooth voluminous testes with practically no intertesticular space, bigger eggs; from *G. tenua* in absence of oesophageal glands, post equatorial dextral ovary, spherical vitelline glands close to each other, bigger eggs, smooth testes; from *G. cedroi* in having ovary smaller than testes and away from ventral sucker; from *G. cryptorchis* in having ovary smaller than testis, absence of oesophageal glands, smooth testes; from *G. carli* in having post-equatorial, closely applying voluminous testes, round ventral sucker, bigger eggs. Further the new species differs from *G. parvicava* in having ventral sucker smaller than oral sucker, larger suckers ratio, smaller eggs; from *G. diaster* and *G. permagna* in having smooth, spherical vitellaria and voluminous postequatorial testes with practically no intertesticular space. Lastly in the symmetrical position of testes, the new species differs from all the species of the genus.

Host	: <i>Rana limnocharis</i>
Location	: Urinary bladder
Locality	: Chhindwara, M. P. India

Gogoderina tanneri Olsen, 1937

See: Jour. Parasit., 23:499.

"G. tanneri together with G. attenuata Stafford, G. capensis Joyeux & Baer, and G. aurora Ingles form a group distinguished from the other members of the genus in that the acetabulum exceeds to oral sucker in size by at least twice. G. tanneri is very closely related to G. aurora from which it may distinguished, as well as from the other species, by the following characters:

1. regularly lobed vitellaria in which there occur four to six, rarely three, lobes each with a slender stem.
2. the greater distance separating the testes from each other and the anterior one from the ovary
3. a more slender body

#

The remaining species of the genus have an acetabulum whose diameter is less than twice that of the oral sucker.

Host: Rana pretiosa B. & G.

Locality: Springville, Utah.

Gorgoderina tenua Rankin, 1937

Is more closely related to G. multilobata Ingles and Langston, 1933, than to any other described species. It differs from G. multilobata in the following respects; very short esophagus, short distance between acetabulum and ovary, no spines around oral sucker and acetabulum, smaller size of ovary and testes, and few lobes in the vitellaria. Differences in certain body ratios are not due to contraction, for observations were made on both living and preserved material.

G. tenua differs from G. attenuata Stafford, 1902, by the small size of the eggs, ratio of oral sucker to acetabulum, and terminal opening of the mouth. It differs from G. carli Baer, 1930, G. cedroi, and G. cryptorchis Travassos, 1924, G. intermedia Holl, 1928, G. parvicava Travassos, 1919, and G. simplex Looss, 1899, by the lobate vitellaria, small size of the eggs, and ratios between organs. It differs from G. aurora Ingles, 1936, by the lobate vitellaria and smaller size with corresponding smaller body ratios. Finally, it differs from G. translucida Stafford, 1902, by the small size of the eggs, comparatively equal size of suckers, and intra- and extra-caecal development of the uterus.



Hosts: Eurycea gutto-lineata

Ref. Jour. Parasit.,

GORGODERINA VITELLILOBI (Olsson, 1876) Looss, 1902

Le genre *Gorgoderina* a été divisé en deux sous-genres, d'une part par PEREIRA et CUOCOLO (1940), d'autre part par FIGULEVSKY (1953), puis en trois sous-genres par FERNANDES (1958).

PEREIRA et CUOCOLO distinguent les sous-genres *Gorgoderina* et *Neogorgoderina*; le premier de ces sous-genres possède des vitellogènes à lobes parfaitement libres, le second possède des vitellogènes à lobes compacts ou superficiellement lobés.

FIGULEVSKY distingue les sous-genres *Gorgoderina* et *Gorgorinna*; le premier a des

vitellogènes très éloignés de l'acétabulum; le second très rapprochés ou au contact de l'acétabulum.

FERNANDES (1958) a ajouté aux sous-genres de FIGULEVSKY, le sous-genre *Metagorgoderina*, caractérisé par des acini vitellins totalement individualisés. Cet auteur a résumé dans des tableaux les caractéristiques des espèces connues en 1958.

L'espèce *vitelliloba* se placerait dans le sous-genre *Gorgoderina* de PEREIRA et CUOCOLO, dans le sous-genre *Gorgoderina* également de FIGULEVSKI ou de FERNANDES.

Nous renvoyons à DOLLFUS (1958), p. 553 à 556, pour une discussion critique de ces divisions taxonomiques.

G. vitelliloba est une des deux espèces européennes du genre, la seconde étant *G. skjabini* Figulevsky, 1953. *G. vitelliloba* est connue du Nord de l'Europe (Suède, Allemagne, Pologne, U.R.S.S.) de Grande-Bretagne, de France, également d'Asie (Sibérie) et Afrique (Maroc).

DESCRIPTION

Les dimensions sont données d'après 20 individus mûrs montés en préparations *in toto*.

Corps (fig. 7) :

Très allongé, aplati dorso-ventralement, il est très déformable sur le vivant.

Ses dimensions sont les suivantes (l'épaisseur est mesurée sur coupes sériées) :

- longueur : 4,60 à 11,95 mm (7,20);
- largeur : 0,86 à 1,82 mm (1,25);
- épaisseur : 0,30 mm au niveau de l'ovaire à 0,60 mm au niveau de la ventouse ventrale.

Cuticule :

Elle est mince (3 μ) et lisse.

Ventouses :

Elles sont circulaires et finement papilleuses.

La ventouse orale a un diamètre qui varie de 389 à 700 μ (490).

La ventouse ventrale est située approximativement au niveau du 1/6 antérieur de l'animal; son diamètre varie de 514 à 1.050 μ (820).

Le rapport ventousaire VO/VV est égal à 0,60 en moyenne.

La distance entre les ventouses est de 910 à 2.060 μ (1.257).

Le rapport distance entre ventouses/longueur du corps est approximativement de 0,18.

Appareil digestif :

La cavité buccale donne directement accès à l'œsophage; il n'existe pas de pharynx.

L'œsophage est court : 331 à 629 μ (405).

La bifurcation intestinale est plus proche de la ventouse orale que de la ventouse ventrale sur la majorité des individus.

Les caécums latéraux, peu sinueux, sont de calibre assez régulier : 80 à 160 μ (119). Ils se terminent à peu de distance de l'extrémité postérieure du corps : 229 à 1.030 μ (556).

Appareil reproducteur femelle :

L'ovaire est grossièrement sphérique, de contour peu irrégulier, jamais lobé. Il mesure de 286 à 651 μ (450) sur 207 à 411 μ (370).

L'oviducte est long, l'ootype (situé entre les vitellogènes) se trouvant nettement en avant de l'ovaire.

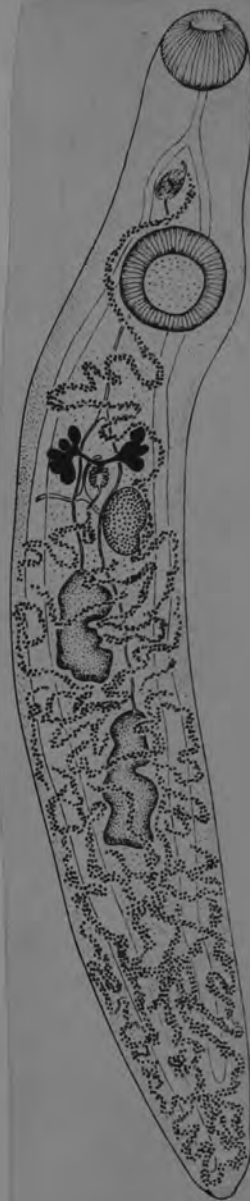
Les vitellogènes forment deux masses lobées qui prennent place loin en arrière (1 à 1,2 mm) de l'acétabulum. Chaque masse comprend de 2 à 7 lobes; ces lobes sont profonds, mais les follicules ainsi formés ne sont pas parfaitement distincts à leur base; 2 vitellogènes transverses et 1 vitellogène médian aboutissent à l'ootype.

La glande de Mehlis se trouve autour de l'ootype, entre les deux masses de l'appareil vitellin.

Le canal de Laurer, long, prend naissance sur l'oviducte à mi-chemin entre l'ovaire et l'ootype.

L'utérus est très développé; ses branches descendante et ascendante forment des sinuosités irrégulières et serrées les unes contre les autres, dans toute la région post-ovarienne. En avant de l'ovaire, la branche ascendante forme encore quelques sinuosités, dont la dernière aboutit au pore génital; la partie terminale de l'utérus a une lumière ciliée. Le pore génital, ventral et médian, est situé juste en avant de l'acétabulum.

Les œufs de couleur jaune-paille à brun clair, mesurent de 25 à 33 μ (moyenne 31) sur 16 à 22 μ (19). Ils sont dépourvus de clapet (l'éclosion se fait dans les mêmes conditions que chez *G. euzeti*).



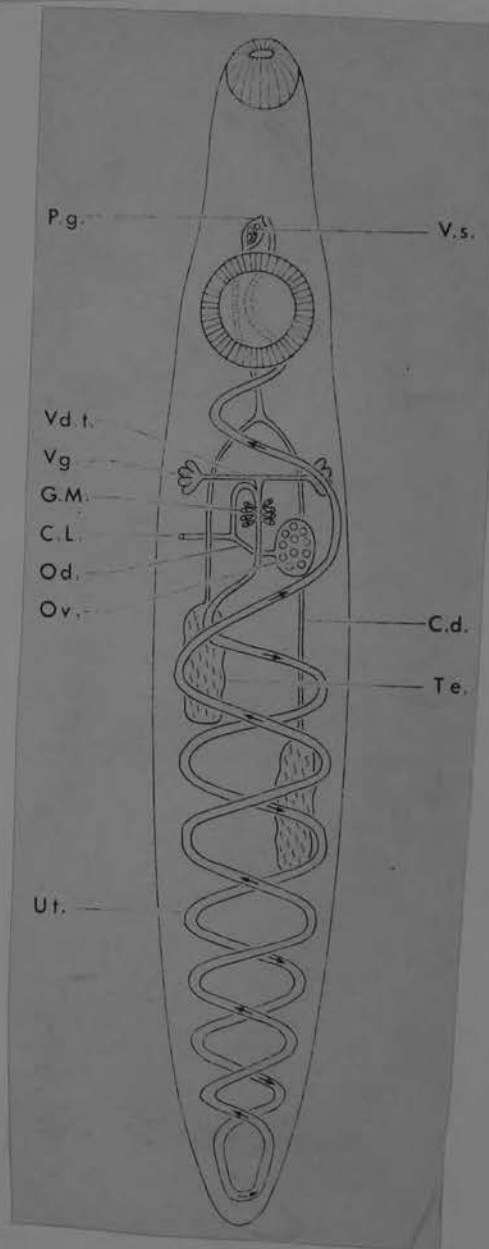
Appareil reproducteur mâle :

Il existe 2 testicules, situés l'un derrière l'autre, légèrement en diagonale, dans la moitié postérieure de l'animal. Ils sont allongés dans le sens de l'axe du corps, de contour toujours irrégulier, quelquefois lobé. Leurs dimensions sont : 400 à 1.063 μ (711) sur 250 à 571 μ (355) pour le testicule antérieur ; 629 à 1.257 μ (900) sur 297 à 537 μ (370) pour le testicule postérieur.

Les canaux déférents prennent naissance à l'avant des testicules et confluent en un canal unique dans la région post-acétabulaire. Ce canal se renfle en une volumineuse vésicule séminale située entre la bifurcation intestinale et l'acétabulum. La vésicule donne naissance à un canal très court qui débouche au canal génital.

Appareil excréteur :

La vessie a la forme d'un tube sub-rectiligne dorsal se terminant en avant par deux petits lobes représentant l'élargissement dilaté des canaux collecteurs, conformément au schéma indiqué par BRYAN, VERARD et HIGAZI (1946).



Gorgoderina vitelliloba (Olsson, 1876)

REPORTED FROM RANA IBERICA BOULENGER, 1879
AND BUFO BUFO GREDOSICOLA MÜLLER AND
HELLMICH, 1935 AND RANA RIDIBUNDA PEREZI
SEGANE, 1885 AT SIERRA DE GREDOS, ESPAGNE
— COMBES AND KNOEPFFLER (1965).

Gorgoderina zigzagorchis Chin, 1963

3. *Gorgoderina* (*Neogorgoderina*) *zigzagorchis* sp. nov. is found in the urinary bladder of the edible frog, *Rana boulengeri*. This remarkable trematode can be readily distinguished from the other species of the genus by its long, zigzag testes. The characteristic vitellaria makes it a member of the subgenus *Neogorgoderina* Pereira et Cuccolo, 1940. This is the first record of *Gorgoderina* reported from China.

BODY 5.6 to 6.2 by 1 to 1.3 mm

EGGS 25 to 31 by 16 to 19 μ

HOST RANA BOULENGERI

LOC. KWEIYANG, CHINA

Author, CHINA T. S. CHIN



图5 *Gorgoderina* (*Neogorgoderina*) *zigzagorchis* sp. nov., 腹面观

GORGODERINA

Gorgotrema Dayal, 1938

Generic diagnosis. — Gorgoderidae, Phyllodistominae: Body flat, divided into an anterior elongate neck-like portion and a posterior expanded portion, covered with minute scattered spines. Oral sucker terminal, with funnel-shaped cavity, Pharynx absent, esophagus long; ceca simple, wide, terminating short of posterior extremity. Acetabulum pre-equatorial, at base of anterior portion. Testes consisting of a large number of small rounded follicles scattered irregularly in anterior half of posterior expanded portion just inside ceca. Vesicula seminalis free in parenchyma. Cirrus pouch absent. Genital atrium present, pore prebifurcal. Ovary just medial to right cecum between acetabulum and testes. Vitellaria two, unbranched, median, postacetabular, on a level with cirry. Uterine coils occupying posttesticular intercecal field; eggs oval thin-shelled. Excretory bladder tubular, with lateral branches, reaching as far forward as posterior testes. Parasitic in urinary organs of fishes.

Genotype: *G. barbuis* Dayal, 1938, (Pl. 33, Fig. 434), in *Barbus sarana*; India.

Gorgotrema barbuis Dayal, 1938

(Рис. 251)

Хозяин: усач (*Barbus sarana* из сем. *Cyprinidae*).

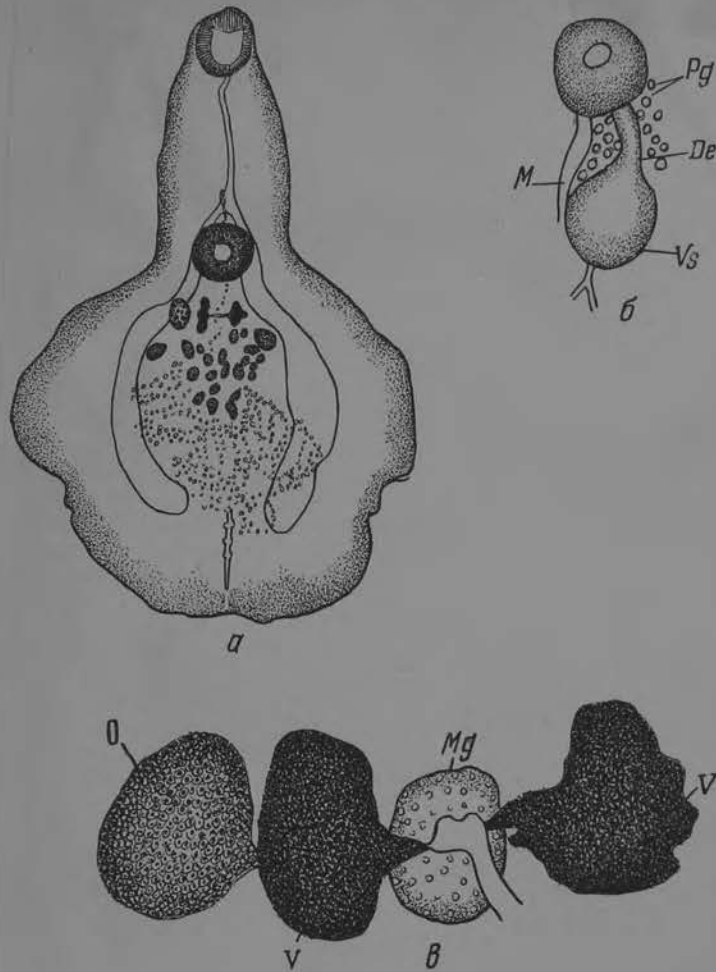
Локализация: мочевые органы (более точной локализации Даяль не приводит).

Место обнаружения: Индия.

Описание вида (по Даялю, 1938). Форма тела грушевидная. Кпереди от брюшной присоски тело червя сужено и вытянуто на подобие конуса. Кзади от брюшной присоски тело паразита расширено в виде не совсем правильной формы диска с неровными краями. Тело червя уплощено в dorso-ventральном направлении, белого цвета. Кутикула покрыта мелкими шипиками. Длина паразита 4,4 мм; наибольшая ширина в задней расширенной дисковидной части тела 2,95 мм. Размеры передней суженной вытянутой части тела 1,87 мм длины и 0,96 мм ширины. Задняя расширенная дисковидная часть тела 2,53 мм длины и 2,95 мм ширины. Ротовая присоска овальной формы, размером 0,47 × 0,44 мм. Брюшная присоска также овальной формы и почти такой же величины, как и ротовая — 0,45 × 0,47 мм. Пищевод длинный, трубковидный, 1,03 мм длины. Ветви кишечника простые, трубковидные, сравнительно широкие в диаметре поперечного сечения, особенно возле слепых концов. До заднего конца тела червя кишечные стволы не доходят. Развилка кишечника находится вблизи переднего края брюшной присоски. Экскреторное отверстие лежит в заднем конце тела паразита на вентральной стороне. Экскреторный пузырь длинный, трубковидный, с почти правильно расположенными амбулоидными вздутиями. Желточники, яичник и семенники расположены близко друг к другу, кзади от брюшной присоски, между ветвями кишечника, довольно далеко кпереди от заднего конца тела червя. Семенники многочисленные, овальной или округлой формы, в количестве до 34—40, расположены позади яичника и желточников между кишечными ветвями, близко друг к другу, все вместе, без разделения на правую и левую группу. Размеры семенников очень сильно варьируют. Мужской концевой половой аппарат представлен семенным пузырьком овальной формы, 0,075 мм длины и 0,06 мм ширины. Половая бурса отсутствует. Семязвергательный канал 0,03 мм длины. Половые отверстия расположены кпереди от развилка кишечника, на расстоянии 0,3 мм; от переднего конца тела червя половые отверстия лежат на расстоянии 1,18 мм. Мужское половое отверстие расположено сбоку от женского. Желточники находятся между ветвями кишечника вблизи заднего края брюшной присоски, кпереди от семенников. Правый желточник цельнокрайный, неправильной овальной формы, 0,2 мм длины и 0,12 мм ширины. Левый желточник с небольшими лопастями, 0,18 мм длины и 0,17 мм ширины. Яичник цельнокрайный, овальный, лежит кзади от брюшной присоски, возле правой кишечной ветви, сбоку от правого желточника; размер яичника 0,19 мм длины и 0,14 мм ширины. Матка расположена кзади от семенников, между ветвями кишечника. Яйца овальные, с тонкой светлокорицевой оболочкой; их размер 0,031—0,035 × 0,022—0,024 мм.

Литература: Dayal, 1938, стр. 63—67.

Сем. GORGODERIDAE



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251. *Gorgotrema barbium* Dayal, 1938 (по Даялю, 1938)
 а — марита; б — концевой половой аппарат; в — женская половая система; М — метратери; De — семязвергательный проток; Pa — простатическая железа; Vs — семенной пузырь; O — яичник; Mg — тельце Мелпса; V — желточники

ГОРГОТРЕМА